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ABSTRACT

A study of the roles of vocational and academic teachers in the integration process involved interviews with 109 principals, other administrators, counselors, and vocational and academic teachers at 10 school sites. The research was designed to build upon and complement studies identified in a literature search that had examined other facets of integration. Six themes emerged from an analysis of the interviews: cooperative efforts, curriculum strategies, instructional strategies, administrative practices and procedures, student outcomes, and teacher outcomes. The first three themes identified stages of integration and roles within the stages that teachers assume as they move from school settings where little or no integration exists to settings where extensive integration efforts are underway. The administrative practices and procedures theme was also characterized in stages that were directed at actions of administrators that can help teachers assume roles outlined for them in the three earlier themes. For both of the remaining themes, the overwhelming majority of the instances were positive. (Appendixes include a list of 24 references, interview schedules, descriptions of interview sites, and sample write-up of an interview.) (YLB)

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TEACHERS' ROLES IN THE INTEGRATION OF VOCATIONAL AND ACADEMIC EDUCATION

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TEACHERS' ROLES IN THE INTEGRATION OF VOCATIONAL AND ACADEMIC EDUCATION

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EXECUTIVE SUMMARY

Over the past several years, integration of vocational and academic education has become recognized as a major reform movement in schools across the United States. The Carl D. Perkins Vocational and Applied Technology Act of 1990, focusing on vocational and academic education integration, reinforces this trend and provides specific mandates for vocational education. NCRVE researchers have examined several areas related to integration such as integration models and major players in the integration process. This study has drawn from previous research as it focused on the roles of vocational and academic teachers in the integration process.

A total of 109 interviews were conducted at ten school sites. Six themes that emerged from an analysis of the interviews included *Cooperative Efforts*, *Curriculum Strategies*, *Instructional Strategies*, *Administrative Practices and Procedures*, *Student Outcomes*, and *Teacher Outcomes*.

1. *Cooperative Efforts* were described as collaboration between vocational and academic teachers related to the integration of vocational and academic education that does not specifically focus on curriculum development or instructional design and delivery. Subthemes identified in the *Cooperative Efforts* theme included Learning About One Another, Offering to Help/Asking for Help, Instructing One Another, Planning Together, Sharing Information About Students, Assisting With Others' Instruction, Dovetailing Instruction, and Scheduling Coordinated Instruction.

2. *Curriculum Strategies* were described as vocational teacher and/or vocational and academic teacher involvement in curriculum building that focuses on integrating vocational and academic curriculum content, organization, and sequence. The subthemes associated with this theme included Coordinating Assignments/ Projects/Instruction, Planning Meetings, Aligning Curriculum, Changing From Past Instructional Patterns/Procedures, Enhancing Curriculum Through Involvement with Business/Industry, and Developing/Designing Projects.

3. *Instructional Strategies* were described as vocational teacher or vocational and academic teacher involvement in actual instruction that integrates vocational and academic education. Subthemes associated with the *Instructional Strategies* theme

included Teaching as Teams, Approaching Instruction Through Application, Incorporating Academic/Vocational Skills in Instruction, Teaching Cooperatively, Using Community People or Resources in Instruction, Accepting Student Initiated Instruction, and Using Common Teaching Strategies.

4. The *Administrative Practices and Procedures* theme focused on activities typically performed by administrators that enhanced the integration of vocational and academic education. These activities should have some impact on vocational teachers and teaching. Identified subthemes included Facilitating the Integration Process, Dealing With Administrative Constraints, Handling Teacher Concerns, and Learning From Experience. Additional subthemes which were identified from comments that were not positive included Scheduling Classes/Organizing Classes, Dealing With Teacher Resentment, Involving Teachers, and Seeking Administrative Support.

5. *Student Outcomes* were described as student change resulting from the integration of vocational and academic education process. This was typically a testimonial about how instruction helped a student or students in some way. Subthemes that emerged from this theme included Performing a Task Better, Learning Across the Curriculum, Making Better Grades/Passing a Class/Staying in School, Approaching Integration Through Application, Becoming More Competent or Proficient, and Accepting Vocational/Academic Programs.

6. *Teacher Outcomes* were described as teacher change resulting from the integration process. This was typically a testimonial about how the integration of vocational and academic education helped "me" or "us" to "become (a) better teachers(s)." Identified subthemes included Recognizing the Value of Integration, Collaborating With Other Teachers, Growing Through Professional Development, Teaming With Others to Teach, Approaching Teaching in Different Ways, and Becoming a More Integrated Teacher.

Although there are many approaches to the integration of vocational and academic education in the secondary schools, the above themes and subthemes emerged from the interviews most frequently and are thus described in this report. Additionally, several attempts at integrating vocational and academic education that were unsuccessful are reported. An extensive listing of teachers' roles in the integration process is also included.

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INTRODUCTION

Over the past several years, the integration of vocational and academic education has become recognized as a major reform in schools across the United States. Several reasons underlying the widespread interest in integration include recognition that schools must change if they intend to better meet the needs of students and employers, and a legislative mandate to integrate vocational and academic education as specified in the Carl D. Perkins Vocational and Applied Technology Education Act of 1990. A parallel reason that vocational and academic education integration has been accepted consists of its goals. As Schmidt, Beeken, and Jennings (1992) indicate, one goal of integration is to provide occupational, academic, and higher order skills to all students, thus enabling them to function effectively in a technological society, information-based economy, and globally competitive marketplace. A second goal relates to the utilization of cognitive psychologists' research findings to enhance students' learning. This goal focuses on teaching students academic and problem-solving skills simultaneously. Students in integrated settings are encouraged to recognize and solve problems through hands-on learning that reinforces academic skills.

In order to understand more about the integration phenomenon, several National Center for Research in Vocational Education (NCRVE) researchers have conducted studies in this important area. Examples of areas examined by NCRVE researchers include integration models (Grubb, Davis, Lum, Plihal, & Morgaine, 1991), relationships between vocational and academic education faculty that facilitate or hinder integration efforts (Schmidt, 1992), the comprehensive high school as a context for integration (Little & Threatt, 1992), and the extent to which integration's objectives are being met (Beck, Copa, & Pease, 1991). These studies, and others conducted by NCRVE, have provided educators with much useful information that can assist them in initiating integrated programs in the schools.

The studies have also provided a meaningful frame of reference and knowledge base for the study detailed in this report. The current study, which focuses on teachers' roles in vocational and academic education, has been conducted in response to the need for clarification of ways that teachers function in integrated settings. In effect, integration calls for schools to function in new ways (Grubb et al., 1991) and teachers who are involved with integration must, likewise, function differently. Numerous factors influence the

delivery of instruction. These factors include what the teacher knows and does, the contexts within which the teacher works, and the key players in the school setting, including vocational teachers, academic teachers, counselors, administrators, and certainly students. Simply suggesting or even legislating that teachers integrate vocational and academic instruction will not achieve the desired effect. Rather, the process of teaching in integrated settings must be documented in a comprehensive manner giving consideration to the contexts within which integration takes place and the key players in the integration process. It is from such an information base that professional development programs may be designed to truly meet the needs of teachers in integrated teaching settings.

CURRENT STATUS OF INTEGRATION

As noted by Finch (1990), reports such as *A Nation at Risk*, *Making the Grades*, and *The Unfinished Agenda* have spelled out a need for reform of both vocational and academic education. Reform has impacted schools nationwide and has led to various curriculum changes. Among these changes are increased graduation requirements, articulation between secondary and postsecondary vocational programs, and an increasing emphasis on the integration of vocational and academic coursework. In the paragraphs that follow, brief descriptions of integration's current status are provided. These descriptions, which have been drawn primarily from NCRVE research, assist in describing a meaningful framework for the current study.

Integration Objectives

Hoachlander (1991) reported that integration is not only included as part of educational reform, in general, but has its own specific set of objectives. One of these objectives is to increase basic and academic skills. Additionally, integration should make vocational courses stronger academically and make academic courses more applied and relevant for the students. Another objective of integration is to improve the cohesiveness of the entire educational curriculum. Through the inherent teacher collaboration involved in the integration process, teaching excitement and students' enjoyment of learning should increase. The breakdown of tracking and segregation is also an objective of integration.

Beck, Copa, and Pease (1991) reported that at selected schools where integration has been implemented, many of integration's objectives are being met.

Integration to Facilitate Workplace Skills

Raizen (1989) reported that one recommended approach to meet the demands of today's workplace is the integration of vocational and academic education. Further, Bailey (1990) has shown that today's workplace is changing and the skills of workers must change as well. Increased international competition, a changing consumer demand toward special order goods, rapid innovation, and technological developments are representative of the changes that require an increase and not a decrease in the skill level of the workforce. In addition to the basic communication, mathematics, and science skills, Johnston and Packer (1987) suggested that today's workers need a number of higher order thinking skills. These include the abilities to work in teams, to share information, and to transfer basic skills to new settings. Evidence supported by Stasz, McArthur, Lewis, and Ramsey (1990) illustrated that there is a declining supply of labor that meets the demands of today's market. Both vocational and academic educators agree that students must learn to think, reason, and solve problems in order to perform in and out of school.

Models of Integration

Plihal, Johnson, Bentley, Morgaine, and Liang (1992) noted there is much effort towards integration at the secondary school level. In addition to the level of activity surrounding integration, they found no clear precise procedures or purposes of integration. Grubb (1991) concurred that various approaches to integration exist and no one approach is appropriate in all school settings. Research conducted by Grubb et al. (1991) has identified eight basic school models or methods that exist for integrating vocational and academic education at the secondary level. The models differ in their approaches and extent of integration.

The first model identified by Grubb et al. (1991) as incorporating more academic content in vocational courses, is the simplest form of integration. It involves no institutional changes, effects only vocational students, and may begin informally.

Basically, the only effort required is on the part of the vocational teachers to locate or develop academic material and incorporate that material into their courses.

The second model, combining vocational and academic teachers to enhance academic competencies in vocational programs, requires collaboration of vocational and academic teachers to modify vocational programs. In this model, academic teachers teach individual academic lessons that can be applied to a particular vocational program and help vocational teachers develop their own academic lessons. Also, the academic teacher may pull out vocational students who are academically deficient and work with them to develop those skills. Like the first model, no institutional changes are needed and only vocational students are affected.

The third model, making academic courses more vocationally relevant, also requires no institutional changes. However, all students could potentially be affected by this model due to the fact that it requires modifying the academic and not the vocational curriculum by introducing vocational applications into the academic courses. The resulting courses are generally referred to as *applied academics* and most have *applied* in their title.

The fourth model, curricular "alignment" modifying both vocational and academic courses, requires no institutional changes, but curriculum teams may promote cooperation. Cooperation is necessary under this model because both vocational and academic courses are modified and then coordinated across disciplines and sometimes over time. The implementation of this model may involve as few as two teachers or as many as all teachers.

The fifth model, senior projects, involves no institutional changes and may affect all students. When in place, this model allows seniors to replace elective coursework with a project that forces them to integrate what they have learned from both vocational and academic courses. Examples of projects include research papers and oral presentations. The subject of the assignments is vocational, and students must meet academic standards. The projects are then used to satisfy vocational and academic credit.

The sixth model, the academy model, requires institutional change because it is a school within a school to be established with teachers from both vocational and academic specialties. The model allows horizontal and vertical integration because the teachers stay

with a group of students for several periods over several years. This model usually targets potential dropouts. Teacher collaboration, block scheduling, smaller classes, and ties to local employers are typical institutional changes of the academy model.

The seventh model, occupational high schools and magnet schools, requires institutional changes because it demands the creation of a self-contained occupational or magnet school. Virtually any student interested in a particular occupational area may be affected by this model. Faculty at these schools offer occupational education with a focus on the integration of vocational and academic subjects.

The eighth model, referred to as occupational clusters, career paths, and occupational majors, requires the creation of occupational clusters within a school. A cluster is a coherent sequence of courses that prepares students for the future. All students are affected by this model and forced to choose a cluster to pursue. In this model, traditional vocational and academic departments are broken down and replaced with the clusters. Ideally, many occupations should be represented by each cluster. Collaboration is required by the teachers, and both horizontal and vertical integration may be accomplished through implementation of the model.

Although these eight specific models have been identified, variations do exist within each one, and the listing is not meant to be inclusive for models of integration. New methods and models of integration may be introduced. Creative thinkers and practitioners should not be stifled by the categorizing of the models listed in this paper.

Key Players in Integration

A number of key players in the integration process have been identified and their broad roles defined by Schmidt, Beeken, and Jennings (1992). The key players included vocational and academic teachers, secondary school principals, secondary school counselors, and secondary school administration and supervisory personnel. During integration, vocational and academic teachers have assumed the roles of leader, team member, learner, and instructor. Secondary school principals have assumed the roles of supporter, communicator, motivator, delegator, and manager. Secondary school counselors have taken the roles of team member, evaluator, and leader. The roles of

secondary school administrative and supervisory personnel have been supporter, communicator, motivator, delegator, and manager.

Strategies that Facilitate or Hinder Integration

Schmidt (1992) has identified integration efforts and categorized them as instructional strategies, curricular strategies, collaborative efforts between vocational and academic teachers, and administrative practices and procedures. Within each category, strategies could be categorized as effective or ineffective. For example, an effective instructional strategy was the inclusion of basic academic skill development activities in both vocational and academic teachers' lessons. On the other hand, integration was hindered when English teachers were reluctant to accept technical materials from vocational classes as references for English papers. Other examples to further amplify the concept of effective and ineffective strategies are as follows:

- A curricular strategy that facilitated integration was to have students adopt a vocational, academic, or combined plan of study as early as possible. A strategy that led to problems was not properly informing the students of the value of a vocational program, especially for those students not planning to attend college.

- One collaborative effort between vocational and academic teachers that was particularly effective toward integration was allowing academic teachers to visit vocational classes and observe how academics are used in vocational programs. Problems occurred when vocational teachers felt inadequate about teaching academic skills or believed that doing so was not their job and that the skills should be taught by the academic teachers.

- An administrative practice or procedure that improved integration efforts was establishing a positive environment and involving all of the teachers in the change. Problems developed when teachers concluded that only vocational and not academic administrators were committed to integration. Obviously, carefully crafted strategies, if collaboratively designed and implemented with due consideration granted all the key players, are effective tools in successful integration initiatives. On the other hand, any strategy may become ineffective if all key players are not considered in the process.

Additionally, Grubb et al. (1991) identified key elements that lead to a successful integration program. The list of elements includes vision and commitment, support, resources, sustained efforts, and teacher training.

Summary

NCRVE researchers have examined many facets of integration. These include the objectives of integration, models of integration, key players involved in the integration process, strategies that facilitate or hinder integration, and the need for integration in facilitating workforce skills. The current study, with its focus on teachers' roles in vocational and academic education integration, builds upon and complements these studies.

PURPOSE AND OBJECTIVES

The purpose of this research was to identify and document teachers' roles in integrating vocational and academic education. More specifically, we sought to

- Identify the roles that are needed by teachers who integrate vocational and academic education.
- Document the contexts within which integration takes place and the key players in the integration process.
- Prepare a set of teacher role statements with accompanying implementation procedures for use by teacher educators, administrators, supervisors, and teachers (see NCRVE report MDS-276, *Helping Teachers to Understand Their Roles in Integrating Vocational and Academic Education: A Practitioner's Guide* by Schmidt, Finch, & Faulkner, 1992).
- Prepare a set of guidelines that will provide practitioners with ways that professional development may be used to facilitate the integration process (see NCRVE report MDS-277, *Using Professional Development to Facilitate Academic and Vocational Education Integration: A Practitioner's Guide* by Finch, Schmidt, & Faulkner, 1992).

PROCEDURE

The research procedure for this study included (1) selecting the sample, (2) developing instruments, (3) training interviewers, (4) conducting the interviews, and (5) analyzing the information gathered. A description of each of these areas follows.

Sample

State vocational education directors were asked to nominate school sites which had successfully implemented the integration of vocational and academic education. Thirty-two nomination forms were returned by the state vocational education directors. In addition, nominations were sought from several national education leaders and NCRVE researchers. The national educational leaders and NCRVE researchers have worked closely with secondary schools in implementing the integration of vocational and academic education. Standards used for the selection of school sites included (1) geographic representation; (2) urban, suburban, and rural representation; (3) school setting combinations of comprehensive high schools, full-time vocational schools, and vocational centers with feeder high schools; and (4) indication that the school sites were involved in advanced stages of integrating vocational and academic education. Standards were used during the selection of school sites to insure adequate vocational student enrollment and adequate numbers of vocational administrators, counselors, and vocational and academic teachers existed to warrant a site visit by NCRVE researchers to conduct interviews. Information related to the standards used for the selection of school sites was obtained through telephone conversations with school representatives prior to the school site selections. School sites in ten different states were selected to participate in the study.

At each selected school site, the individual suggested by the nominator of that site served as the contact person. Because of our need to interview those administrators, counselors, vocational teachers, and academic teachers who were successfully working with the integration of vocational and academic education, different numbers of interviews were conducted at each school site. For instance, at one school site three administrators, one counselor, four vocational teachers, and two academic teachers were interviewed. At another site, one administrator, one counselor, five vocational teachers, and two academic teachers were interviewed.

Instruments

The interview approach was chosen over other techniques and objective instruments because of its flexibility and adaptability (Kerlinger, 1986). The interview schedule used for this research was labeled as moderately structured (Stewart & Cash, 1985). The interview schedules contained open-ended and probing questions that followed each major question. The probes were a mixture of open-ended and closed-ended questions. This funneling technique allowed the freedom to probe into and to adapt to different interviewee answers like the nonstructured interview does, but it also provided a schedule for the interview. The moderately structured interview was selected based on a decision to employ the strengths, and not the weaknesses, of both the structured and nonstructured interviews (Stewart & Cash, 1985).

A key element of the face-to-face interviewing process was the Behavioral Event Interview (BEI). The BEI was developed by McClelland (1978) and colleagues at McBer and Company. It is based on the Critical Incident Technique that was created by Flanagan (1954). The BEI was developed so that a particular critical incident could be explored until behaviors, thoughts, and feelings were adequately reported (McClelland, 1978). Respondents may initially discuss behaviors they believe are critical, and with additional probing they can reveal all relevant behaviors that occurred in the event. The BEI had a successful history of use in a variety of settings, including business, industry, education, and the military (Finch, Gregson, & Faulkner, 1991; Huff, Lake, & Schaalman, 1982; Goleman, 1981; Spencer, 1979).

Interviewer Training

The BEI process demands that interviewers be highly skilled in conducting interviews. Two of the researchers underwent extensive interviewer training during a previous NCRVE project. At that time, a specialist in the BEI process conducted an interviewer training session for the project researchers. For this project, the two trained and experienced researchers, in turn, provided a third researcher with training in the principles for behavioral event interviewing including the use of probing questions and how to build rapport. Following a training session, pilot interviews were conducted and critiqued. Further, as an outcome of the pilot interviews, the instrument was refined to make the interview process more efficient and effective.

The Interviews

Researchers visited each school site and conducted interviews with principals, other administrators, counselors, and vocational and academic teachers. During each interview, the interviewee was first asked to recall a specific situation. This was a situation or a specific time when the interviewee and others (both vocational and academic teachers) were particularly effective at integrating vocational and academic education. The interviewee was asked to give attention to the roles of both vocational and academic teachers in this situation. Next, the interviewee was asked to recall another situation when he or she and others (both vocational and academic teachers) would, due to hindsight, change what had been done. In other words, this is a situation where the integration of vocational and academic education could have been improved. Again, the interviewee was asked to recall the roles of both vocational and academic teachers in this situation.

Prior to describing the two events, the interviewee was asked to answer a few short questions discussing the various roles of individuals at the site in integrating vocational and academic education. In addition, the principal was asked to describe the history of the integration of vocational and academic education at the school site and was asked to answer questions about the school site demographics. After describing the two events, interviewees were asked specific questions about their backgrounds and professional experience. A total of 109 interviews were conducted at the ten school sites. Descriptions of the ten school sites where interviews were conducted are contained in Appendix D. Based upon a preliminary examination of events, 197 of the 218 events were classified as useable and twenty-one were either unusable or not fully developed events. Copies of the *Principal Interview Schedule, Administrator (Nonprincipal) and Counselor Interview Schedule*, and *Vocational and Academic Teacher Interview Schedule* are provided in Appendices A, B, and C, respectively.

ANALYSIS

After each interview was conducted, the interviewer completed a one- to two-page write-up for each event. The write-up was prepared in first person and read like a story. The purpose of the write-up was to organize and present the interview transcript in an understandable sequence and format. The write-ups also provided researchers with meaningful information that had been carefully organized to better facilitate analysis and coding. Information contained in each write-up was organized into *situation*, *who was involved*, *behaviors/thoughts/feelings*, and *outcome* (Mentkowski, O'Brien, McEachern, & Fowler, 1982). A sample of an interview write-up is provided in Appendix E.

The interview process generated several thousand pages of interview notes, event write-ups, and coded information. To avoid a data overload, we utilized a comprehensive analysis system in the form of a computer software program titled *The Ethnograph*. This software enabled researchers to code, group, recode, and regroup information according to established and emerging themes.

Based on the initial review of write-ups from one site and building upon the categories identified by Schmidt (1992), several themes emerged. As coding continued, the number of themes grew until six could be identified. The six themes included *Cooperative Efforts*, *Curriculum Strategies*, *Instructional Strategies*, *Administrative Practices and Procedures*, *Student Outcomes*, and *Teacher Outcomes*.

Cooperative Efforts (CE) were described as collaboration between vocational and academic teachers related to the integration of vocational and academic education that does not specifically focus on curriculum development or instructional design and delivery. Included in this theme were statements such as sharing student information and completed assignments from students; sharing competency lists, books, materials, and equipment; working together to focus on students' needs; observing other teachers' classes; and providing other teachers with general suggestions for change.

Curriculum Strategies (CS) were described as vocational teacher or vocational and academic teacher involvement in curriculum building that focuses on integrating vocational and academic integration curriculum content, organization, and sequence. Organized around this theme were statements such as restructuring academic courses to be more

applied, restructuring vocational courses so they include more academic content, designing student projects that cut across vocational and academic education classes, participating in joint curriculum planning meetings, imbedding vocational/academic content in vocational/academic courses, and building more content from an employer and employment base.

Instructional Strategies (I) were described as vocational teacher or vocational and academic teacher involvement in actual instruction that integrates vocational and academic education. Included in this theme were statements such as incorporating vocational/ academic skills into day-to-day instruction, using vocational and academic teams to teach classes, employing class projects and assignments that are jointly sponsored by vocational and academic teachers, and illustrating applications via equipment and supplies from other (vocational/academic) teachers' area.

The *Administrative Practices and Procedures* (A) theme focused on activities typically performed by administrators that enhance the integration of vocational and academic education. These activities should have some impact on vocational teachers and teaching. Included in this theme were statements such as organizing vocational and academic teachers into collaborative curriculum and instructional teams, planning professional development activities for teachers, resolving integration disputes among teachers, monitoring integration activities, making necessary adjustments, and evaluating the success of integration activities.

Student Outcomes (SO) were described as student change resulting from the integration of vocational and academic education process. This was typically a testimonial about how instruction helped a student or students in some way. Included in this theme were statements such as "getting a job interview," "feeling more competent or proficient," "being able to perform a task," "staying in school," and "getting better grades/being a better student."

Teacher Outcomes (TO) were described as teacher change resulting from the integration process. This is typically a testimonial about how the integration of vocational and academic education helped "me" or "us" to become "(a) more effective teacher(s)." Coding was done for both vocational and academic teachers. Included in this category

were statements such as "teaching more relevant content," "getting along better with vocational/academic teachers," and "understanding more about a vocational/academic area."

In addition to being classified into a theme, text could be categorized as positive, negative, or neutral. These categories were cross-referenced with various themes to assist the researchers as they prepared the theme texts.

Positive (P) responses were defined to be those that described something positive happening due to the integration process. Included in this category were statements such as "we used the integration procedure for a while and found that it really worked" or "I was very pleased with the joint content selection procedures."

Negative (N) responses were defined as those that described something negative happening related to the integration process. Included in this category were statements such as "we used the integration procedure for a year and eventually found out it was no good" or "I feel the joint content selection activities were a waste of time."

Neutral responses were defined as statements that did not belong in either the positive or negative categories.

The coding process thus yielded a three by six theme matrix. It is portrayed as follows:

	CE	CS	I	A	SO	TO
Neutral	CE	CS	I	A	SO	TO
P	CEP	CSP	IP	AP	SOP	TOP
N	CEN	CSN	IN	AN	SON	TON

TEACHERS' ROLES IN INTEGRATION: THEMES AND SUBTHEMES

Teachers' roles derived from this study have been organized into the following six identified themes: (1) Cooperative Efforts, (2) Curriculum Strategies, (3) Instructional Strategies, (4) Administrative Practices and Procedures, (5) Student Outcomes, and (6) Teacher Outcomes. Information contained in the themes was further organized into subthemes.

This section contains discussion and excerpts from write-up analyses organized by themes and subthemes. The themes and subthemes logically progressed through various stages of development for achieving the integration of vocational and academic education. Themes advanced from *Faculty Cooperation* and *Curriculum Development* to *Instructional Strategies*. The *Administrative Practices and Procedures* theme complements these themes through fostering a climate for achieving the integration of vocational and academic education. *Student* and *Teacher Outcomes*, in turn, reflect the positive benefits that can accrue through integration. It should be noted that, just as the integration process can flow from one stage to another, subthemes may also relate to one another. Thus, the text supporting a particular subtheme may not be mutually exclusive from another subtheme.

Cooperative Efforts

Based on our examination of events, we noted that integration proceeds in stages. An initial stage in the integration process is for vocational and academic teachers to establish collaborative relationships with one another. These relationships often begin with the teachers simply learning about one another, offering to help or asking for help, or providing inservice development activities for one another. At the next stage, vocational and academic teachers begin planning together and sharing information about what they teach and their students. At the more advanced stages of cooperative efforts, vocational and academic teachers assist with one another's instruction, including team teaching; they carefully dovetail instruction between courses; and they achieve coordination of scheduling for the dovetailed instruction. Our review of the statements in the cooperative effort theme resulted in the identification of nine subthemes. Descriptions of the nine subthemes along with sample statements illustrating them follow:

1. Learning About One Another
2. Offering to Help/Asking for Help
3. Instructing One Another
4. Planning Together
5. Sharing Information about Instruction
6. Sharing Information about Students
7. Assisting with Others' Instruction
8. Dovetailing Instruction
9. Scheduling Coordinated Instruction

Learning About One Another

Prior to the time efforts were undertaken to integrate vocational and academic education, vocational and academic teachers seemed to have little interaction with one another and limited knowledge of what others taught. Vocational teachers, from two different school sites, noted,

> I have been at this school for twenty-four years and serving on the committee to work out the projects with the English teachers is the first time I have gotten to know any of the English teachers and the librarian.
>
> When academic teachers visit the vocational center and learn of what is taught in the programs, they invariably say they had no idea of the extent of academic skills needed in the vocational programs.

When vocational and academic teachers first met together, they sensed that change was imminent and reported having feelings of hostility toward one another. For example, vocational teachers said,

> At the beginning, it was like a line was drawn with the vocational teachers on one side and the academic teachers on the other side, with each side saying "you are not going to step on my toes." The vocational teachers were saying "the students need to know this before they get to us." And the academic teachers were saying "you don't tell me how I am going to teach my class." It took about a year of meetings for the two teacher groups to realize they wanted the same things.
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> In fact, we vocational teachers were very defensive because of the negative feelings expressed by some of the feeder school teachers. They were telling some of us that we were not good enough, and because we worked in the

> field, we did not have the understanding to teach as classroom teachers. Although I do not think I would have changed my mind, I feel that if I could have looked at the situation from the feeder school teachers' point of view a little more, I would have been able to make those teachers see where we vocational teachers are coming from.
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> At the meeting, the academic teachers looked at the vocational teachers and the vocational teachers looked at the academic teachers and neither group knew where to get started.

With time, the teachers started to become more open-minded and began to set the stage for collaborative relationships to develop. Further, they started to realize that they needed one another's help. Statements like these, from teachers at two different sites, substantiate this phase:

> Because I am a skills teacher, it was easier for me than some of the other teachers to accept the change. Further, the science teacher who teaches the technology class and the principal who was a math teacher were very supportive of the [collaborative] project. So, between the principal, the science teacher, and me it did not take long for the other teachers at our school to come around.
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> All the science teachers in the county were called to the vocational center and provided a program to help them understand why science is important in technical education. They also shared information about what students need back at the home schools. We have found if we don't cooperate with the feeder schools, they send us the wrong students.

Interestingly, several teachers reported that learning about and support for the integration of vocational and academic education developed from teachers having the opportunity to attend professional meetings away from the school. They stated the following:

> I have been privileged to attend four SREB staff development summer meetings. Although it is probably too expensive, the school should have gotten every teacher there, especially the English teachers. As a teacher, you just come away from those meetings all fired up. You can listen to the presenters and say "hey, this does work."
>
> I was invited to provide a presentation about my Applied Mathematics course at a regional meeting sponsored by the National Science Foundation. At the same meeting, the two Principles of Technology teachers from my school came to my session. They were interested in what I presented and came up after my presentation. The three of us began to talk. They said that they had heard their students talk about the Applied Mathematics course, and they wanted to know exactly what it was all about. Now, at least these two teachers, one of them a vocational teacher, understand my

class. It is really good to know that the vocational teachers are interested in what I teach.

Offering to Help/Asking for Help

From the interviews, we noted that a basic step in vocational and academic teachers working together is for them to be able to offer help to, as well as to ask for help from one another. For example, a math teacher interviewed went to an agriculture teacher to seek help with providing more relevant instruction. In another instance, vocational teachers loaned equipment and supplies for use in an applied mathematics class, and a Principles of Technology teacher was working with the physical sciences teacher to share equipment. However, feelings of intimidation on the part of vocational teachers can often keep them from asking for needed help as can be seen in the following:

> I went to a junior high teacher and asked for help because I did not feel comfortable talking to the math faculty at this high school. And, only recently I went to the chair of the math department of this high school and talked with her about my concerns. This is what I should have done in the beginning.

In asking for help, teachers must be sensitive to not taking advantage of other teachers. An academic teacher notes how a teacher can expect too much of another teacher:

> When we started to integrate, I would go to the shop teachers and say that I need a job application and I need it by Friday. I didn't realize how busy a shop teacher's day was, being a new teacher myself. My college preparation didn't give me any knowledge about the type of students in shop classes nor their needs.

Another academic teacher found a more positive way to approach a vocational teacher. In this instance, a student gave an academic teacher the impetus to seek help. The teacher notes, "I went to the auto mechanics teacher and told him about the auto mechanics student teaching the class how to use the vernier calipers and micrometers. The auto mechanics teacher proceeded to help me better understand the use of these tools."

On the negative side, one academic teacher expressed a need for support from the vocational teachers, but did not seem to know how to ask for it. The teacher commented as follows:

> I am willing to accept a variety of things as good English activities. However, I find that the vocational teachers do not support the development

> of the skills. If the vocational teachers would support the English teachers, we would have better students and a better school.

On the positive side, another English teacher organized a project for English students to work with kindergarten and first-grade students. As part of the project, the English teacher asked other teachers to help with the young children the day they visited the high school. This teacher noted that the vocational teachers "were wonderful in offering to help." In another example, an English teacher notes that the business teachers were most helpful. She states, "I met with the business teacher to get advice on assigning research papers dealing with vocational subjects to my English students. The interviews with the business teachers were great."

And from the vocational side, a vocational teacher for a broadcast journalism program offered to help teachers across the school by having his students do live videotaping for them. He noted that the psychology, literature, and social studies teachers often come to him for this help.

Instructing One Another

The interviewees reported instances where academic teachers instructed vocational teachers, where pairs of vocational and academic teachers instructed other teachers, and where vocational teachers instructed other teachers. Teachers can definitely learn from one another. As one vocational teacher states,

> A teacher can pick up a lot from other teachers, regardless of the context of the interaction with the teachers. Every teacher has certain techniques that work, techniques that can be translated from one classroom to another, whether the content being taught or the situation is exactly the same or not.

Some instances where the teachers instructed one another were more successful than others. Often those providing the instruction were apprehensive when called on to serve as leaders for inservice education activities. Further, when difficulties arose, they were often due to lack of knowledge about the context of others' instruction. An English and business teacher worked together to provide two workshops on reading in the content area, one to teachers at a high school, and one to teachers at a career center. The workshops were based on one the two teachers had attended as part of the Southern Regional Education Board-Vocational Education Consortium summer staff development

conference. Here is what happened when they presented the two workshops as reported by the English teacher:

> We should not have conducted the workshop at the career center in the same way as at the high school. Several of the teachers attending the workshop at the career center made comments that they did not see how the workshop content applied to their particular classes. One of the teachers mentioned that there was no problem with student reading because students are shown how to [do things in vocational classes].

As a solution to the resistance encountered on the part of the vocational teachers, the English teacher commented as follows:

> I wish we had gone over to the career center ahead of time and picked up textbooks used by teachers there. [Further], I wish we had looked over these textbooks and talked to the teachers individually ahead of time and found out how much reading is required in the courses. I know that many of the [technical] manuals are written above the twelfth-grade reading level.

In another situation, a marketing teacher organized an inservice course on learning styles for other teachers. Initially, thirty teachers signed up; but by the time the class was taught, only ten teachers showed up for the first meeting. The marketing teacher summed up the experience as follows:

> I was really enthusiastic about the course since I engage teachers in learning as I teach the course. The teachers are led through a process where they design lesson plans that actively engage students in learning. The low enrollment was really discouraging to me. But then I thought, if there were only ten teachers that engaged students in learning, that is progress.

Planning Together

At all ten school sites visited, the interviewees gave us examples of experiences the vocational and academic teachers had in planning together. At initial stages of planning, the most frequently expressed feelings were negative. Then as the planning evolved, teachers' negative feelings waned and the focus of their attention became projects and activities they were planning together. Providing teachers with time away from their daily routine was a major factor in their successfully planning together. However, in the day-to-day school setting, teacher schedules that allowed for joint planning were helpful.

Comments that follow indicate the degree of skepticism and concern vocational teachers expressed at the beginning of the planning process. They seemed to feel

particularly negative in respect to the opinion that academic teachers had of them, what they teach, and their students:

> The academic courses for students with a vocational focus need to be parallel with their vocational program, more applied. However, if an academic teacher has never been in the world of work, that teacher can't relate what is being taught to the world of work.

> When the teachers from the vocational center and the feeder high schools began meeting together to start implementing basic skills, some of the high school teachers were very negative toward the vocational teachers.

> When we started the new program about three years ago, I did not feel too good about it and I do not think anyone felt good about it. The new program did not affect the academic teachers the way it did me. For example, the math teacher got the same students so it really did not affect her. [In the beginning], I think, we vocational teachers were more interested in our own programs and the subject matter we teach [than in planning with the academic teachers].

Principals and counselors noted the problems of teacher resistance toward planning together as these comments indicate:

> Initially, when the academic and vocational teachers were trying to get together to plan basic skills, there was a lot of discord and the teachers could not key in on what they hoped to accomplish because each teacher had a different vision of where he or she was going.

> The integration seminar was held from 3:00 p.m. to 9:00 p.m. While the speaker was talking, the same staff members got excited about it, and the others just wanted to fight it.

> The ninth-grade project is now operating relatively smoothly with good cooperation between the vocational and English teachers. However, as new teachers were added each year—tenth grade, then eleventh, then twelfth—we went through similar problems of teacher resistance and concern.

The academic teachers also noted feelings of hostility between them and the vocational teachers at the beginning of the planning process. One academic teacher stated,

> It was almost open warfare with accusations coming from both sides and a lot of finger pointing. At each meeting, the teachers just walked in and sat on different sides of the room and had a showdown which I could see was not getting us anywhere.

Time away from the day-to-day routine of classes emerged as essential in getting teachers to plan together. The following comments from an administrator and a principal express the need for special planning time:

> I (administrator) met with a group of vocational and academic teachers to plan the integration activity. This group then went to the area office to speak to the staff. Arrangements were [then] made to release the teachers from school. The group met at the area offices so we would be away from the school campus.
>
> Three years ago when the integration efforts first started here, about twenty teachers attended the SREB-Vocational Education Staff Development Conference in Nashville. After the conference, these twenty teachers became the integration writing team. The team members met for two weeks in early August, full days, to work on integration activities.

Teachers from four separate schools described outcomes of planning together, particularly in respect to the need for time to do so, as follows:

> At first, the group working on the curriculum changes thought that the only changes needed would be in the vocational classes. This thinking soon changed as it became apparent that the vocational teachers needed help. The vocational and English teachers involved in developing and carrying out the projects have met over, and over, and over.
>
> A couple of years ago, fifteen teachers, vocational and academic, sat down and spent a whole inservice day, seven and one-half hours, compiling what we thought was important for the students to know and how we were going to work together to deliver it.
>
> First we met in a general meeting and then broke up into smaller groups of science, math, business, and communications teachers. The teachers from all five of the vocational center feeder high schools as well as vocational center teachers were present.
>
> After many, many meetings between the English and vocational teachers and modifying the projects many times, the freshman and sophomore projects are running fairly well.

When planning for integrated activities takes place during the school day, teachers noted that close proximity to those they were to plan with was important. In addition, having schedules that allowed for frequent discussion with one another, often daily, was also important, as the following comments show:

> One thing about our business department is that we are in the same building as the math teachers so we can be together at lunch. We do a lot of informal

planning during our lunch period. This leads to a great deal of sharing among the math and business teachers.

The applied math teacher and I (vocational teacher) have a common planning period. We discuss projects where our students can cooperate.

It is a time element because I (academic teacher) do not always have time to get together with the vocational teacher; we do not have the same planning periods.

The teachers described a number of different instruction-related projects and activities that vocational and academic teachers had planned together. Activities included technical reports, reinforcing medical terminology, compiling health data, calculating interest, and a variety of career projects. Here is what two different pairs of vocational and academic teachers had to say about projects that were planned together:

About four years ago the English teacher came to me (horticulture teacher) and asked me about having the students write a twenty-page comprehensive technical report on their laboratory area for English class. I think the English teacher and I were trying to make the student more aware that English isn't just for English class. English is an extension of the horticulture laboratory experience, and the horticulture laboratory experience is an extension of English.

My scholastic math magazine had an article about diabetics that gave me an idea. As the math teacher, I wanted to work with the health occupations classes to provide a realistic example of how a diabetic cares for himself/herself. A health occupations teacher and I talked about how to present this information to a class using one of our diabetic students. I feel that this activity was the best example of integration that I have ever seen. Now, if there are any health-related issues in my magazines, I go to the health occupations teacher and ask her if she could help me teach the activity.

Planning together allows vocational and academic teachers to develop ownership of the integration process. Further, interviewees who did not become involved in the integration process at their schools from early on expressed regret. Here are comments from a vocational teacher and a counselor that address their feelings about involvement in planning:

I (vocational teacher) don't feel that all of the other teachers take advantage of the avenues open for cooperation between vocational and academic teachers as much as I do. I would like to see a closer association between the two types of teachers.

> I (counselor) attended a meeting of the academic and vocational teachers a few weeks ago and the teachers were working smoothly together. The teachers at the meeting were asked if they had [the planning] to do over again would they go through the process again? Consensus among the teachers was the process was worthwhile. It is easier due to hindsight to look back and say yes.

Sharing Information about Instruction

We found that *Sharing Information About Instruction* was a common subtheme that surfaced in interviews at most of the schools. The teachers had both positive and negative experiences when they shared this type of information. More importantly, they realized the necessity of sharing information about instruction if meaningful integration of vocational and academic education was to be achieved.

Much of the sharing had to do with learning about specifics of what others teach as indicated by these comments:

> I (the principal) found that as a result of involvement in the basic skills project, teachers got together and learned about applied physics and mathematics courses.

> The automotive instructors from the other schools and I (also an automotive instructor) sat down and talked with the English and math teachers from the feeder schools. We were trying to create a braintrust between the two groups. A lot of the academic teachers have no idea what we cover. We did get a good relationship going.

> The first year there were four or five meetings with the vocational teachers where teachers discussed what had been taught. As a result of the meetings, the teachers were able to get the schools heading in a more common direction and more common goals were developed. As the meetings were going on I (an academic teacher) became more and more excited about what was going on.

Two of the vocational teachers reported on their experiences in trying to share their instruction with counselors, particularly in respect to the need for basic skills instruction. As their comments show, the vocational teachers did not feel they were effective in communicating with the counselors:

> I (a vocational teacher) wanted the counselors to know that students came to the laboratory to work and to learn so that when they get out of school, they can earn a living. Also, I took the opportunity to show the counselors the textbooks being used in the welding laboratory. Some of the books are written on the college level. But the counselors got so interested in trying to

> weld and making sparks and noise and smoke that we did not spend time talking about the importance of reading, writing, and math. Now, I would show the counselors examples of notebooks I have my students keep. I would want the counselors to look at the students' reading and spelling. I want the counselors and the academic teachers at the feeder schools to realize that my welding students need good English and math skills.
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> When the Principles of Technology course was first offered, the guidance counselors had an incorrect perception of the purpose of the class and how it could benefit students. They scheduled a disproportionate share of learning disabled students for the course the first year. The first year that Principles of Technology was offered under a vocational course code and, I believe, the guidance counselors just automatically classified it as a low level offering.

On the more positive side, here are comments from three vocational teachers who spoke favorably of sharing information about instruction:

> I (the agriculture teacher) shared with him (the math teacher) a number of problems we use in agriculture that require extensive application of math. One of these had to do with costs to produce beef cattle. It involved calculating hay costs, pasture costs, protein supplement costs, interest costs for borrowed money, veterinarian costs, vaccination and insecticide costs, and so on. This situation, as well as others related to such things as forestry and greenhouse production that I gave the math teacher, involved extensive application of math skills.
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> As the welding and machine tool operator teacher, for two or three years I have had an informal exchange and visitation program with a ninth grade physical science teacher.
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> I had met the teachers in the English department last summer during the curriculum writing institute so I knew who I wanted to talk with. They also knew me well enough so that I could get straight answers from them. I felt like I was going to have to teach some of my students basic writing skills.

One business teacher, on the other hand, found that not sharing information about instruction with an English teacher led to the two of them teaching different grammar rules. The business teacher stated, "Before I teach the unit on the use of commas again, I will talk to the English teachers about the comma rules they teach in English class."

Academic teachers also tended to report favorably on experiences they had in sharing information about instruction. Their comments included the following:

> When I read something in my math book that is technology oriented, I go to the auto mechanics teacher and ask him to explain the procedure to me. I feel very comfortable asking for help from the vocational teachers. The auto

> mechanics teacher says he feels intimidated because he feels I know so much more math than he does. I feel that he knows more math because he uses the hands-on approach to teach math every day. I teach math using the theory approach.
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> He (the Principles of Technology teacher, considered vocational) shared with me (a math teacher) the idea of using a test stack on hypercard. Each student would have a separate set of problems to solve on the computer. If the student answered the problem incorrectly, the student had to go back and try to solve the problem again. If the student answered the problem correctly, the student could go on to the next problem.
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> I (a math teacher) got together with the Principles of Technology teacher (considered a vocational teacher) to discuss the Cartesian coordinate system. The Principles of Technology teacher said that he had the perfect milling program for the student to learn the system. This program is actually an introduction to machine work.

One English teacher, however, did not experience support from the vocational teachers when sharing information about instruction. The English teacher reported,

> Many of the vocational teachers came here from industry and feel that they are doing the job they were hired to do and don't want to mess with teaching students to write English papers. Further, the vocational teachers didn't want to read the papers, indicating that they do not know how to grade grammar and spelling. That is not, however, what the English teachers expect of them. Rather, I and the other English teachers want the vocational teacher to read the papers for content.

As with the previous subtheme of *Planning Together*, lack of proximity between vocational and academic teachers and lack of time for them to be together were also barriers in their sharing information about instruction. These negative comments from three vocational teachers indicate the need for schedules that allow vocational and academic teachers to work together:

> Relying on exchange of information with the academic teachers at the monthly meetings only is not enough, even as good as the meetings are.
>
> In the eleventh grade agriculture class I teach, I cover genetics and genotype ratios, something the students learned about in tenth grade biology. Yet when I start to discuss the topic, it seems that they have never heard of it before and I have to reteach everything from the beginning on genetics. This same situation arises on other things the students have covered in their academic classes. One problem is that the vocational programs are located in a separate building from the one the academic teachers are in. The teachers seldom have the opportunity to talk with one another. In fact, the most frequent way that the vocational teachers communicate with the academic teachers is by telephone.

> The teachers, academic and business, need to sit down and spend more time thinking things through and planning on a longer term basis. For example, next year on the English project, a couple things need to be done differently.

One of the principals we interviewed also noted that not having a time and place where vocational and academic teachers regularly share information about instruction works against implementing the desired integration activities. The principal stated the following:

> If the teachers had more time so they could get together to do joint activities, it would be better for all of them. For example, in the technology education program there are several computers and there is quite a bit of information there that the agriculture, applied physics, and applied math classes could utilize. If the teachers had offices together, they could share things with each other.

Sharing Information About Students

Several of the interviewees, including vocational teachers, academic teachers, and counselors, discussed instances where sharing information about students was a factor in implementing the integration. We found that the vocational teachers tended to need help from the academic teachers with problems the students were having learning academic skills, while the academic teachers tended to call on the vocational teachers for help with discipline problems.

Vocational teachers from three different schools described their need to share information about students achieving academic skills and their experiences in doing so as follows:

> The problem of many of the students who are preparing for vocational and technical occupations not doing well in the academic classes still exists. The vocational teachers need to do more to communicate with the academic teachers about the needs of these students, particularly, the need that their instruction be made more relevant and applied in their academic classes.
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> I (a vocational teacher) was frustrated with the student's basic skills. So I went to the teacher of the at-risk students who is also the reading resource teacher to ask for her advice. She confirmed that I needed to give the students a little more direction and guidance.
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> I recently shared one student's written work with the two communications instructors at the vocational center. These two instructors felt that this student needed help, and these instructors are now helping this student. He is assigned two days a week for thirty minutes each day to see a

communications instructor to receive help with English. He is also scheduled two days a week to work with a math instructor to upgrade his math skills.

One math teacher's comment supports that the vocational teachers feel relatively comfortable in going to the academic teachers for help with academic skills problems their students have:

> The students were having trouble calculating the scales (for example, a scale of one centimeter equals twenty feet) and calculating how to figure angles for survey triangulations—how to calculate diagonal distances. The surveying instructor let me know that the students were having difficulty with these calculations.

On a different note, a counselor reported on the success of parent-teacher conferences when vocational and academic teachers worked together to share information about students with their parents:

> The day of the parent-teacher conference when I (a counselor) saw academic and vocational teachers working together discussing with parents the career paths related to vocational education and graduation and attendance policies, I just thought that was one of the highlights of the integration activity. Getting teachers involved with other teachers in discussions with parents is really good.

In regard to discipline problems with students that keep them from succeeding in academic classes, vocational teachers reported that they helped academic teachers with these problems and that the academic teachers came to them for help. Here are statements from two vocational teachers describing this situation:

> Personally, I am in touch with the academic teachers at least weekly. Vocational teachers seem to have a greater effect on the students and I help the academic teachers with discipline problems.

> A student was seriously discussing dropping out of school because of the problems he was having in his academic classes. I (an agriculture teacher) visited with his academic teachers to find out what the problems were and helped the student on a one-to-one basis. Further, I worked with the teachers and the counselor to have the student's schedule changed. For another student who wanted to drop out of school and who was causing disturbances in his academic classes, I took him as a teacher's aid several periods a day. He then did not attend some of the academic classes that he did not need for graduation. I feel comfortable talking with the academic teachers and helping them resolve problems with students who are in my agriculture classes.

Academic teachers, likewise, noted that they depended on the vocational teachers for help with student discipline problems. Three academic teachers described help they got from vocational teachers with discipline problems:

> As far as discipline is concerned, all of the teachers in my cluster work together. For example, if I am having a problem with a student in my class, I can specifically go to each of the shop teachers, and we can meet and formulate a discipline plan for the student. Further, the teachers in my cluster have a discipline express list that contains the names of ten or so students that can no longer be disciplined according to the usual methods. I have seen nothing but positive results as an outcome of the interaction between vocational and academic teachers on handling classroom problems.

> (The same teacher continued, describing an experience with a particular student.) One of the students in my class was also in the building construction cluster. In my English class, he really didn't seem to want to do his work. I tried to talk to him about what was wrong and why he wasn't doing his work, but I didn't get anywhere with him myself and I felt frustrated. As a last resort, I went to the building construction teacher who filled me in on a family problem that was upsetting the student. He and I talked confidentially about the family problem the student was having and then I understood the student better.

> As a group at the cluster faculty meetings, the faculty take time to discuss various problems, including those of individual students. Often students the academic teachers are having trouble with can be appealed to more easily by the shop teachers. The shop teachers can get closer to the students as they have fewer students to deal with. At the meetings, the shop teachers gain an insight as to what is happening to their students in the academic classes. The meetings open channels of communication between vocational and academic teachers.

In one instance, a counselor saw that as a result of the cluster approach to integration that the same students were together not only in their vocational classes, but also in their academic classes. The outcome of the students being scheduled in clusters was that they became more familiar and closer to one another than in the past which, in time, led to discipline problems. The counselor described the situation in the following way:

> The interrelations with students are more complex as a result of the clusters because the students become closer to one another. To counteract this situation, the vocational teachers work with the academic teachers to help solve discipline problems. Some of these problems might exist even if the students moved in smaller groups, but clustering them in larger groups seems to add to the number of problems and the complexity of them. The vocational teachers can help solve the problems because they really get to know the students; they almost become second parents.

Assisting with Others Instruction

Both vocational and academic teachers gave us examples of assisting one another with instruction and with receiving assistance from one another. The teachers who worked together felt that giving students the impression that they supported one another and functioned as a team was important. However, not all experiences the teachers had in assisting with others' instruction were positive.

One vocational teacher who had assisted an academic teacher described the experience as just something to be expected as part of integrating, while another vocational teacher described the experience as positive. Here are their descriptions:

> An English teacher was trying to teach word processing for the first time, and she did not know the software package. She did not feel comfortable teaching the software. The English teacher was apprehensive because she did not know the software. I told the English teacher that I would be in the computer laboratory to help her with the instruction.
>
> I always think it is great to work along with the math teacher, and the English teacher too. I am one-hundred percent behind them. With the extra credit requirements that the county places on the students, the vocational center could not survive without the math and English teachers.

The following comments from academic teachers at three different school sites show that they welcomed assistance with instruction from the vocational teachers:

> I like my classroom; yet, at the same time as students have changed over the years, I need all the help I can get. I think that the reinforcement of a vocational teacher coming into my classroom and saying what is important is good.
>
> I talked to the computer laboratory teacher and I told her about my plans to better utilize the students' computer skills. She said "Well that's what I teach. Why don't I come in and help you out with that." The computer teacher knew exactly what I was doing and she was excited about helping me. I was also excited that she was going to help. I know from past experiences that when a guest speaker teaches the class, the students believe this speaker more than the regular teacher.
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> Students have a lot of questions that I (the language arts teacher) cannot answer and there are times that I have heard the question before but I realize that the vocational instructor is the expert. I feel that masonry is not my area, but I am very comfortable teaching in the masonry class and believe the students are also comfortable. I believe the masonry instructor is comfortable with the situation as well.

On the flip side of the situations the preceding academic teachers described, several vocational teachers also welcomed assistance with instruction from the academic teachers. Here are comments from an academic teacher, a vocational teacher, and an administrator supporting this attitude:

> One day the metals teacher came to me with a particular problem. He said that he could not get his students to use indexes. The metals teacher said that when he told the students to look up a part or start filling out an order form they wanted to thumb through the manuals and the process took forever. The metals teacher wanted to know if there was something that could be done to help his students. Only a few of the metalworking students were taking my language arts class and they were not the ones that needed help. So the metalworking teacher and I sat down together and decided to team teach the metals students.
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> More specifically, two of the students worked with the art teacher to design the wedding invitations (for a mock wedding). My class prepared a program for the ceremony. Students worked with the business teacher to input the program on the computer. Most weddings don't have programs, but because the parents were invited, we wanted everyone to know who was the bride, groom, and others involved in the ceremony.
>
> The automotive teacher said he didn't feel comfortable trying to help the students with their writing and in pointing out grammatical errors. The reading resource teacher helped with the final grading of the letters.

Both a vocational and an academic teacher, each from different school sites, commented on the need for teachers working together to integrate vocational and academic education in order to present a united front to the students:

> I think that the physical science teacher and I (a vocational teacher) should sit down for a short time to get our act together as a team. We did not act like a team during his last visit to my class. We acted like a visitor and a speaker.
>
> As the year has progressed, we discuss daily, usually after class, what we would teach the next day. The mechanics teacher and I are constantly talking; that is the nice part about having the academic teachers and the vocational teachers housed in the same building. I never taught with anyone before and I'm the type of a person who wants everything organized so I know what I'll be doing in my classes the next day and the next week. With the mechanics teacher, this is not a problem. We plan our daily labs together and then each of us takes charge of all the students to go over selected material. We discuss together what each of us needs to reinforce with the students.

In two instances, academic teachers reported negative outcomes when they assisted vocational teachers with instruction:

> As the math teacher, I think the machine teacher welcomes me when I come to his laboratory. However, I have heard comments about the machine teacher like "Is he looking for time off?" or "Maybe he needs a break." Since the machine teacher came to me and asked me to start coming to his laboratory, that is a possibility. However, I would like to think that is not the case.

> The academy teachers were looking to build interviewing skills. The business teachers gave the math teachers a checklist of what interview skills the business teachers were looking to build and what they wanted the students to achieve. The business teachers, for example, explained to the math teachers what was meant by body language and how to read it, since it was one of the skill areas the business teachers were trying to build. The students, however, resented the math teachers evaluating them on business skills.

Dovetailing Instruction

As integrated activities between vocational and academic classes developed, the teachers realized that they needed to dovetail their instruction so that they were reinforcing one another. *Dovetailing Instruction* involves the teachers being sure that academic skills are approached the same way by both vocational and academic teachers. Vocational teachers at three sites commented on the need to dovetail instruction as follows:

> I talked to the math teachers about the assignment to make sure I was doing the right thing. I had previously gone to the math teachers about a couple of algebra problems. I wasn't presenting the material to the students quite right. The math teachers gave me some ideas as to how to better present the material. So when I got ready to do the trigonometry unit, I sat down with the math teachers and made sure I was approaching the unit correctly.

> The English teacher informed the business teachers about the format and the outlines that the English teacher wanted the students to use when writing their term papers. The business teachers each talked individually with the English teacher regarding the students from the business academy in their particular classes.

> We (the business teachers) needed to get together with the math faculty to share concerns and try to do the best for the students. We needed to work together to pick out the textbook. We didn't do that. The math faculty picked out the book. We had no input. We needed to ask them to let us share in this decision. We also needed to talk about teaching techniques. For example, do the math faculty use calculators. Should we use calculators? How do the math faculty test the students? How do the math faculty handle homework?

Academic teachers at four sites also reported on the need to dovetail instruction:

> At a math curriculum writing meeting, I talked with the industrial arts teacher who is working with the vocational technical center. I told him how I taught the ruler. He said that he did not teach the ruler that way. He then showed all the math teachers how he taught the ruler. I was concerned that he was teaching students the mark and the number that goes along with it. The industrial arts teacher enlightened me because all of the top numbers or numerators are odd and all the bottom numbers or denominators are always even. So the fractions are already reduced. He thought that everyone taught that way. So, the industrial arts teacher and I had misconceptions about how the ruler was being taught in each other's courses.

> Last year's business education instructor was very good about giving the math teachers input as to what she wanted the students to know when they came to her classes. The math teachers worked with the business education teacher to make sure that related activities between the math classes and the business classes were taught in the same way. The business teacher would give us, the math teachers, outlines to follow on what her classes would be doing each quarter. Our job was then to relate the business outline subject areas into our instruction. Home health is a new program here and the teachers are trying to do the same sort of dovetailing of instruction for it.

> When the vocational teacher introduced the topic of calculating interest in her class, she came to me in the math department and asked which formula I was using to calculate interest. We decided to use the simple interest formula.

> I (a freshman English teacher) think because of the nature of the curriculums, there was not a clear understanding of what the other person's role was. The vocational teachers and freshman English teachers haggled the assignment out by first writing the behavior objectives, and finally we were able to come up with a really strong program.

Failure to carefully coordinate or dovetail instruction led to problems for both vocational and academic teachers as noted in these comments:

> I (a principal) believe that the first two teachers still don't feel that writing to the intended audience is an acceptable way of writing a senior paper. The teachers are still in the negotiation process of trying to work out what they are going to do.

> As a health occupations teacher, I worked with the general chemistry teacher on teaching students the metric system. I thought the chemistry teacher understood how I wanted to approach the subject and what she was supposed to do because we had talked about it at a meeting. Obviously, what I said and what she heard were two different things.

Scheduling Coordinated Instruction

When projects and assignments in vocational and academic classes were coordinated as part of each type of class, we learned that scheduling for the instruction and meeting deadlines became critical. Both vocational and academic teachers noted difficulties they encountered when attention to scheduling was lacking. The following comments from two vocational teachers and a principal address this problem from the vocational teachers' perspective:

> As the business teacher, I did not know about the business letter the students were to write for the project much before it was assigned. I needed to know about the English assignment to write the letters for the term project in advance. I could then go over content and details on how to write the letter in more depth before the students started writing. The students knew the format for their letters but not the content.
>
> The vocational teachers needed directions by the day for when to start the projects, what materials were needed when, and when to stop. Further, better communication between the vocational and English teachers is needed.
>
> I (a principal) see that the trust level between the English and vocational teachers is still precarious at times. The English teachers must rely on the vocational teachers to supply the information for reports written and presented in the English classes.

Vocational teachers also noted that they needed academic teachers to teach specific topics or materials prior to the students' using the information in the vocational classes. Here are comments from three vocational teachers addressing this need:

> I (an electronics teacher) asked the physics teacher if he could switch the sequence and teach the electronics portion of the class first so that it would coordinate with what I was teaching the students in the electronics laboratory.
>
> I (a vocational teacher) had talked with the substitute science teacher about the project. She felt that it was a good project and something that we needed to do. But when the regular science teacher returned, he felt that he was behind in his class; and his students did not have time to go to the laboratory to finish the coordinated project.
>
> The English teachers didn't know the projects for the different levels of students which really messed up the cooperative efforts. The vocational teachers would come to me (a vocational teacher who coordinated the projects for the vocational teachers) and ask me what was to be done for the English projects each nine weeks and I would tell them. The English teachers, however, didn't know what was to be done. This situation went on for most of the second year projects.

Two academic teachers also noted concerns they had related to scheduling when instruction was to be coordinated between their classes and vocational classes:

> I sensed that the first year, before we got some things worked out, that the vocational teachers felt I was infringing on their time. Several of them did not see the need for a math teacher to be at the vocational center and they thought I was taking time from their instruction. There was a lack of communication on all sides.

> So the business teachers and I (an English teacher) tried to get in touch with people out in the community to provide information to the students and that was not done as fast as it should have been. The feedback was not rapid, so by the time the papers were due, the business teachers and I had not heard from all the people in the community.

Curriculum Strategies

The second theme in the integration process that our interviews enabled us to identify was one of vocational and academic teachers working together on various curriculum development efforts. These ranged from two teachers working together for relatively short instructional periods with one or more students to highly elaborate projects involving all of the vocational and language arts teachers for students from grades nine through twelve. The teachers we interviewed described how they made curriculum decisions, how they planned what to teach and when, and how they encountered and resolved problems of aligning vocational and academic curriculum. Success in aligning curriculum was heavily dependent on the teachers communicating with one another.

The curriculum development efforts frequently required that both vocational and academic teachers change from past instructional patterns, patterns that had at times been in place for years. Once the changes were implemented, even teachers who initially resisted tended to become proponents of the new integrated curriculum—a curriculum that called for vocational teachers to reinforce academic skills and academic teachers to use applied instructional procedures. Not only did the curriculum development efforts involve the two types of teachers, but they also resulted in the teachers involving individuals from business and industry to provide input and resources for enhancing the new instructional activities.

Descriptions of the six *Curriculum Strategy* subthemes along with statements from the interviewees that support them are discussed here. The six subthemes are as follows:

1. Coordinating Assignments/Projects/Instruction
2. Planning Meetings
3. Aligning Curriculum
4. Changing from Past Instructional Patterns/Procedures
5. Enhancing Curriculum From an Employer/Employment Base
6. Developing/Designing Projects

Coordinating Assignments/Projects/Instruction

The interviewees found that successful integration required that teachers plan curriculum together to assure coordination of assignments, projects, and instruction between vocational and academic classes. Here a vocational and an academic teacher reported favorably on planning experiences they had related to coordinating curriculum with another teacher:

> The math teacher and I prepared some additional handouts with exercises for the student. In the handouts, the math teacher and I introduced the student to using decimals instead of fractions. It was a real good experience for me to work with the math teacher.

> When the computer teacher and I got together to coordinate the lesson, she showed me her handouts and, from me, she got some examples. We were doing some temperature conversions at that time. So I gave the computer teacher the correct answers to the sample problems. Then she finalized the actual lesson plans.

In two other instances, a vocational and an academic teacher did not have favorable experiences when coordinating curriculum with another teacher. They note,

> I think the chemistry teacher and I should now do more in terms of writing the integration steps down. We should also meet part way through the activity instead of waiting until the end. We need to make sure we are doing the activity the way we want it to turn out.

> This was a case where a construction teacher and I (a physics teacher) collaborated and planned a project. We had the rules written up and we were ready to implement the project. But the construction teacher was always busy with meetings. I was too busy to work with the project also. Finally, we just got frustrated and gave up on the project for the year. We probably should have just implemented the project earlier in the year. I think we should have gotten together and looked at our programs to see where this project might have effectively fit in. Also, we should have decided what we wanted the students to come out of the project with and then figured out how to do it. We should not let the tail wag the dog by planning a mouse trap competition when it does not fit into the curriculum.

When more than two teachers were involved in coordinating instruction, more problems were encountered. Here are three examples of somewhat negative experiences encountered when vocational and English teachers were involved in coordinating instruction—one reported by a vocational teacher, the other two by principals:

> In the beginning, the English resource teacher met with us (the vocational teachers) to determine what to teach. She had no specific directions as to what she was to teach. She felt that she should teach what we requested her to teach, which was technical reading and terminology needed for various vocational programs. For example, to help the carpentry students, she taught carpentry terminology and reading technical manuals. In doing this, she ignored the broader communication skills that are needed for success in adult life.

> This past year, the faculty continued [illegible]s on reading in the content area. English department faculty members [illegible]ed to prepare a definition of what a sentence is, what a paragraph [illegible]t formats should be used for answering a discussion question and for preparing a research paper. It was almost funny because the English department took almost a semester to agree among themselves on these things. The information was then printed on card stock and distributed when the English department presented an inservice program to the entire faculty. At this meeting, the importance of writing in the content area was stressed.

> Next year for English, the English teachers are incorporating more assignments into a final project for the business students. There is a research project and an oral presentation integrated together. This idea came from an English teacher and next year the students will formally present their projects before several teachers. I (a principal) think they are going to make the projects more business related next year.

At one school we visited, an elaborate four-year career development project that required coordination among all vocational and English teachers was underway. The comments that follow from two vocational teachers and an academic teacher provide insight into the complexity of this effort:

> A committee prepared outlines for projects that students were to complete cooperatively between their English and vocational classes for all four years—freshman through senior years. The second year of the projects, the teachers, both English and vocational, were not all cooperating.

> Once the committee worked out the cooperative assignments that were to be completed between the vocational classes and the English classes, the teachers cooperated to different degrees. No deadlines existed for the projects and things really got messed up. The students would be bringing information needed for the reports to their English classes at all different times.

> The first papers that the students turned in were horrible. As a result, the vocational and English teachers scheduled a two day meeting to rewrite the career assignment. The rewriting took a lot of working together to get a real sense of what the vocational teachers wanted and what we English teachers could live with, and then we had to figure out how we could achieve that. By working together to revise the assignment, it gave us a much more comfortable feeling in learning to work with the integration process. The career assignment is so thoroughly defined now that there is simply no way that a student can be in the dark about what is to be done, and just as importantly, the teachers are not in the dark. They all know exactly what they want the students to do and when.

Planning Meetings

Vocational and academic teachers worked together in a number of different settings to plan the integration of vocational and academic education. Meetings that involved small numbers of teachers, from two to five, tended to be viewed more favorably by the teachers than when larger groups met. Projects and activities planned when two to five teachers met included using tables of content and indexes, which was planned between a metals and a language arts teacher; income tax preparation, which was planned between a business and a math teacher; helping four-year olds in a child care program write stories, which was planned between an applied communications and a home economics teacher; and science applications, which was planned between a construction and a physics teacher. Here is the comment of a principal regarding the teachers' planning of integrated projects:

> For example, one day when we were having lunch with the university people, the math teacher had one of his great ideas. He suddenly thought of how science, math, and technology could accomplish a common task. Right at the lunch table, these three teachers started developing another lesson plan. The university people were amazed. I told them that this is how it happens. These three teachers have developed a matrix showing an overlap in concepts for math, science, and technology. They planned a weekly project list of things they could do in either a team teaching situation or actually switching teachers in classes. I realize that I am fortunate to have a staff that is committed to the integration project.

When teachers participated in more formal meetings with larger groups of teachers, difficulties were more likely to surface when the plans were implemented. At five of the school sites, we learned of these situations. Here are details from three of them:

> As an outcome of the week-long session between the vocational and academic teachers, a book of lesson plans was compiled. The vocational teachers received copies of both the vocational teachers' plans and the academic teachers' plans. The academic teachers were also to receive a copy of the plans, but I don't know if they did or not. Further, as a

follow-up activity, I (an electronics teacher) was to develop some lesson plans for math and English competency development in my vocational program. The idea of the plans was not as much innovation as identifying the basic skills that were included. The plans I developed were somewhat helpful, but most of the basics for math I already knew from the use of math in my electronics class.

The information that the teachers developed at the workshop was to be put in a required curriculum book; it was supposed to be typed and the teachers were to receive a copy. I (a vocational teacher) know the teachers are still making comments about the curriculum book and the fact that we never received copies of it. None of us teachers seem to have forgotten that we never saw the curriculum materials again after we worked so hard on them. It was like a student writing a report and not getting a grade and not ever seeing it again and thinking "Did I do all that work and the teacher just threw it in the trash can?"

It took two efforts to get a curriculum writing team together to have a meeting to work out the research assignment. I (an English teacher) felt that two English teachers were purposely late to the meeting because they were angry. I think the English teachers felt pressured for their time and this integration was an infringement on their time. I believe these English teachers have no idea what goes on in the vocational classes, and they do not want to find out.

At two of the school sites, we heard reports of favorable outcomes from planning meetings that involved large groups. These comments are from principals at the two sites:

The team members, five teachers, and the curriculum resource teacher, who served as the team chair, met and met and met, spending their time learning what went on in one another's classes. During the two weeks, this team developed a big packet of activities which were duplicated and distributed to all teachers. The team members held sessions with their colleagues to introduce the materials to them. For example, the applied communications teacher, who was on the committee, gave a presentation to all twenty-six English teachers as to what can be done to integrate vocational and academic education in English, emphasizing what she was doing in her own class.

As a logical extension of the writing program, the high school has initiated a program where senior students who are enrolled in vocational education courses prepare their English course research papers on topics that are career or skill related. The purpose of the assignment is not to water down the English course but to enrich learning for students and do something the students can be proud of. When the project was initiated, I was thinking that it would be another tool to cause teachers to talk to each other and work together. Since the English and vocational teachers developed the format and the rules and how the paper would be evaluated, that enabled the teachers to work together.

Teachers also reported frustration when they did not participate in coordinated curriculum planning activities. Here are statements from three of these teachers, two of them vocational and one academic:

> I (a vocational teacher) think we need more planning of curriculum at the department level to integrate the science curriculum. We need to communicate with one another, and we need a structure to integrate the curriculum. We need to formally plan for the integration. I think the science teachers are driven by their curriculum. They are also frightened with change and with the laboratory setting. As a matter of fact, they are probably a little intimidated when I suggested we work together.

> I (a home economics teacher) would like to see the English and math skills the students receive here at the vocational center more related to their vocational programs and to life in general. For example, when my students are working on memos to parents, the English teacher could help them to write the memos. Or when the students are studying what it costs to live on your own, to have a car, and so on, the math teacher could relate instruction to budgeting and finances.

> As a school-within-a-school English teacher, I am supposed to coordinate with the vocational instructors and help my students learn about the vocational programs. No tenth-grade vocational programs are available for the students, however, thus a full year gap exists. Further, I am to work toward putting applied activities in the ninth-grade English that I teach, yet I have little, if any contact with the vocational teachers.

Aligning Curriculum

In developing curriculum, both the vocational and academic teachers we interviewed noted the importance of aligning their curriculums with one another. The vocational teachers worked to imbed academic content in their classes that reinforced that taught by the academic teachers. The academic teachers, likewise gave instances of how they adjusted to the content of the vocational classes. Here are comments from four vocational teachers describing experiences they had with aligning curriculum to reinforce academic competencies in their vocational classes:

> What I (a home economics teacher) really should have done before assigning the students to write résumés is to have talked with the business teacher to discuss the different ways of writing a résumé. The business teacher and I should have come up with one single way to write a résumé. When we did discuss résumés, the business teacher and I decided that in my home economics class I would discuss the interviewing techniques, and in the business classes, she would discuss writing a résumé.

> Since the English teachers have become more aware of the need for basic skills, they have been more willing to work with me (a business teacher).

> Also, more of the teachers have become cooperative. I think that at first the English teachers were reluctant to cooperate. One of the English teachers was reluctant because English was her territory, but she has come around. The English teachers and I now collaborate in the student use of computers to prepare English writing assignments.
>
> As a part of the business academy, the business teachers had to plan and integrate at least one activity per month with one of the math teachers. The activity had to be written up and turned in. As a business teacher, I had to figure out when the English classes were going to do certain things and then I could plan my lessons around that. Further, I had to teach ways of doing things the English teachers preferred.
>
> The curriculum writing team focused on developing ideas for teaching specific skills in every class. We had the ideas typed up and we picked common times for emphasizing the skills. For example, in week three of school we would all emphasize study skills with our students.

The following four comments from academic teachers describe their experiences with aligning curriculum between vocational and academic classes:

> I (a math teacher) do work with the vocational teachers to determine the math skills they want stressed for one period each week that I teach math in their programs. Mainly, they want me to focus on fractions and algebra.
>
> The computerized office occupations teacher had already taught a unit on calculating interest. By the time I (a math teacher) taught this in my class, I felt that I was reinforcing. I took what the students had already learned, and I manipulated it in a different way.
>
> For example, on some lessons, both of us (math and business teachers) use the same type of evaluation, and sometimes the same worksheet that the students were given in the business class was used in my math class. The math and business teachers work with percentages that way. We both teach percentages, and the students are assigned homework from both classes to reinforce what they are learning.
>
> I (an applied math teacher) talked to the vocational teachers before the second year began and found out what they expected from their students that would be enrolled in my course. Based on this information, I decided to teach fractions earlier in the school year. I also talked to other math teachers about when they covered different material so I could arrange my instruction better.

Changing from the Past

We found that the integration of vocational and academic education required changes from past procedures in both program offerings and in class instruction. A common pattern was for the vocational teachers to resist the changes initially, then to move

toward acceptance and support of them. Interestingly, the changes seemed to affect the vocational teachers more often than the academic teachers. These comments from two principals and two administrators provide insight into the resistance to change on the part of the vocational teachers:

> The vocational teachers felt at first like they were having something taken away from them. However, now the vocational teachers accept math and communication as part of their classes and can see an improvement from the time a student begins the year to the time a student finishes the year.

> The first year I worked with the vocational teachers on implementing an integrated competency-based curriculum, they thought they were going to be asked to rewrite their curriculum. It didn't take long, however, for them to realize that they were already doing most of what they needed to be doing and were now going to document it.

> The vocational teachers were satisfied with the way they were teaching the programs and did not see the need to have students taken out of their courses to learn math—math that they did not even perceive as needed. The vocational teachers resisted; they kept saying: Do we really need to be doing this? However, after many times of meeting together, the math teacher and the vocational teachers did establish what the math teacher was to teach. First, the vocational teachers had to determine the math skills that were needed for their programs. This was a problem for them because they tended not to teach things that required students to use math. For example, the students would not be required to set the lathes, the teachers themselves would preset them and then the students would all complete the same routine assignment. Now the vocational teachers accept what the math teacher contributes as a most important part of their programs.

> The integrated curriculum is a complete shift of educational paradigms. The faculty have found that it is most effective to use applied biology and applied chemistry for science, and the applied math in with algebra one, especially for teaching concepts. Further, applied communications has been incorporated throughout the language arts division. The faculty chose this way rather than having a specific course in communications. For the most part, the teachers have a better appreciation of what basic skills mean.

One principal reported the process used at his school site to overcome resistance to change on the part of some vocational teachers:

> The positive vocational teacher, however, asked the negative vocational teacher if his students didn't use math and writing skills in his class. The negative vocational teacher had to agree that they did and eventually he came around to supporting the project the committee developed. It was sort of an outgrowth of some of the things the positive vocational teacher was already doing with his students.

One counselor also noted the problem of resistance on the part of vocational teachers to making changes needed to integrate vocational and academic education:

> Some feet dragging and resistance existed on the part of a number of vocational teachers, particularly the nondegree teachers who had been hired directly from industry. These teachers have expertise in their craft areas and were hired to teach their crafts. They probably did not fully understand what the new integrated approach would mean. They expressed concern that their vocational programs would be gone or so wishy-washy as to be of no value. As new teachers are hired, the tendency is to hire ones with both technical training and a college degree, thus the number of nondegreed teachers is fewer and changes are more easily implemented.

One vocational teacher concurred with the above statements. He summed up the feeling of resistance on his part as follows:

> When first asked to incorporate this writing assignment into my classes (electronics classes), my initial thought was when do I do these reports. My time with the students is already full, so how can I add something more. I don't like to change my curriculum. I might teach the same thing for ten or twelve years without changing. Some of us vocational teachers really balked at doing the reports and it took almost two years to come up with good assignments. It seems that the English teachers can simply incorporate the project assignments into what they were already doing while the vocational teachers have to give up class time. I now support the projects, however.

Other vocational teachers, however, in noting experiences they had in changing from past practices gave examples that had positive outcomes. Here are examples of this type of statement from two vocational teachers:

> Technical writing was the way the workshop I (an electronics teacher) attended was listed. The academic teacher conducting it started by pulling out an electronics dictionary and looking up a topic, super hetrodine receiving. She read verbatim the definition. It was overwhelming. She used this example to say that teachers need to gear information in class to the target audience, the students. In other words, rephrase the same thing in different ways so that students will receive it. I support this idea. If I assign my electronics students technical writing without telling them they are doing technical writing they will not draw back and shut down. If I want the students to write something, I ask them to explain a process they already know how to use to another individual who does not know the process.
>
> I (an auto mechanics teacher) was desperately looking for a nontraditional method of reviewing a lesson. The students were on a unit that was long and even I was getting tired of it. It was about time to start testing the

> student on the unit. Then, I thought of the idea to assign the students to write a letter which worked very well.

Math teachers from two different school sites reported opposite experiences in regard to changing from past procedures. The first statement is from a math teacher who found the change to applied mathematics positive. The second statement is from a math teacher who had a negative experience when attempting to provide students an applied experience:

> Before the applied math course was offered, some ninth- and tenth-grade students took a general math class. In this class, no matter how I varied my teaching and delivery style or how well I tried to bring in different activities, some of the students seemed turned off. Then I began to introduce applied math procedures. Now, I feel so strongly about the first year of applied math that I have told the counselor that every senior should take applied math and then algebra. Further, if students then took the second year of applied math, they would get a good score on their ACT test.

> I had the students do the assignment with the calculators so I would have an integrated activity to submit to the office. Actually, the students made fewer mistakes when computing the problems by hand, and both ways took about the same amount of time. Either the students did not know how to use the calculators, or they just goofed off on the assignment. I forced the issue of integration.

Enhancing Curriculum Through Involvement With Business/Industry

Through the interviews, we learned that integration involved the use of input from the business community for the purpose of enhancing curriculum. Both teachers and students went on field trips to businesses, and individuals from the business community came to the school sites where they served as guest speakers and advisory committee members. The purpose of the interaction with the business community was, for the most part, to reaffirm the need for students to master basic academic skills and interviewing skills.

These comments describe experiences teachers had with field trips they made to the business community themselves and field trips they arranged for the students. Field trip experiences were viewed to be positive and worthwhile:

> At first, I (a vocational teacher), was not very enthusiastic about the workshop. I had attended workshops before and, as far as I was concerned, most of them were a waste of time. During the workshop, the workshop leader took participants to several businesses in the city including

> industries, one a machine shop and one a woodworking factory. We also visited construction sites and were shown how houses are constructed and how stress factors for construction are computed using a microcomputer. I suggested to the workshop leader that these field trips be filmed so teachers could share the information with their students.
>
> As I mentioned, the field trips proved to be particularly effective in developing and reinforcing the skills the team wanted to emphasize with the at-risk students on a field trip each nine weeks, but we didn't have the time to plan for the field trips that often. Field trips are complex and take a lot of planning, planning time that the team of teachers didn't have.
>
> The business teachers and I (an academic teacher) had no difficulty finding the vocations in the business community. The problem may have been in sending the students to the business people, they may not have had the time to talk with the students. The business teachers and I are going to have to interact better with the employers.
>
> I (a counselor) was involved in scheduling a field trip to a plastics manufacturing plant for academy students. I believe the purpose of the trip was to give students an orientation to business and manufacturing and to show them how math, science, and verbal skills in manufacturing are related to school studies.

To enhance curriculum, the teachers also had business people come to the school sites. The business people served on advisory committees and as guest speakers. The teachers viewed the input from the business community as supporting the need for integrating vocational and academic education as these statements indicate, one from a vocational teacher and one from an academic teacher:

> Initially, the student projects that were worked out between the vocational and English teachers resulted from advisory committee input. The advisory committee indicated that the students' preparation was not broad-based enough; the students need more basic academic skills to meet today's workplace requirements. I agreed with this thinking and was very much in favor of changes in the curriculum. When the school received a grant to implement curriculum changes, I (an English teacher) jumped at the chance to participate and to help develop the cooperative vocational and English class projects. In part, I was motivated by my frustrations as an English teacher.
>
> Having now developed a closer relationship with the business community, I (a vocational teacher) realize that employers want both technical and academic skills.

While several ways exist for business people to be particularly helpful in assisting teachers with instruction, one way is related to interviewing skills. Here are comments

from two academic teachers illustrating the importance of involving business people in developing students' interviewing skills:

> The vocational teachers know what I (an academic teacher) teach and are very supportive. They have worked with me to get people from the community involved in the hiring process to help while I am teaching the students job-seeking skills. They give me names of people to contact who are hiring employees that might come to my class and actually interview students.
>
> For the interviews, there was not enough advance coordination at the student level. Both sets of teachers, academic and business, were frustrated by this. We had to rethink things and to include the students more. The business and academic teachers decided if we did the interview activity again, an outside group of people, from the business community, if possible, would do the interviews.

Developing/Designing Projects

At five of the school sites, we learned of instances where vocational and academic teachers had cooperatively developed projects that resulted in the integration of their curriculums. Some of the projects were quite elaborate and required extensive commitment on the part of the teachers. Further, the project activities, although difficult at times to implement, were not viewed negatively, indicating that such activities are a viable process for successfully achieving the desired integration of vocational and academic education. Some projects did, however, require give-and-take negotiations on the part of both vocational and academic teachers.

At one school site, three separate vocational teachers reported on curriculum projects they had developed with academic teachers. Their comments follow:

> One of the English teachers and I (an automotive teacher) worked together to help the automotive students with their interviewing skills. The co-op students were having trouble with their interviews. So the English teacher and I developed a set of skits to help them learn how to and how not to act during an interview.
>
> The math teacher and I (an electronics instructor) came up with an abbreviated textbook that had all the math skills required for the electronics curriculum.
>
> In order to incorporate English with what was being taught in horticulture laboratory, the English teacher and I (a horticulture teacher) decided to require the students to write a technical report during their junior year.

At another school site, a principal and a vocational teacher reported on cooperative curriculum projects developed by vocational and academic teachers. The vocational teacher noted working with a counselor as well as a language arts teacher on the project. Both emphasized that the cooperative experiences the teachers had led to positive outcomes:

> The metals teacher and the English teacher developed a module on the use of indexes in a metals factory. These teachers provided textbooks, reference books, and so forth for the students to work with indexes. The county curriculum coordinator thought the module on indexing was super. While this skill is already in the curriculum at the feeder schools, teaching it at the vocational school is real exciting.
>
> So, knowing that my students did not have résumés, the language arts teacher, the counselor, and I (a business teacher) decided to develop a unit on résumé preparation. With the assistance of the counselor and the language arts teacher, I prepared a computer program that assisted students to properly format their résumés. For this program, the counselor provided examples of current résumés and what information would be needed on the basic data sheet. The language arts teacher assisted with the résumé format. I felt that working with the counselor and the language arts teacher as a team was a good experience.

Further, at another school site, a vocational teacher and two principals reported on experiences teachers had in developing career projects coordinated between vocational and English teachers:

> The curriculum committee that I (a vocational teacher) was part of discussed what could be done, beginning with the freshmen. The freshmen were already using some career exploration materials as part of their English classes, so the committee decided to expand on the use of these materials. The materials help the students think about different jobs and how they fit the requirements for them. At first the committee planned too much for the freshmen year and those ideas then carried over to the sophomore year. The first efforts of the committee were extremely rough, yet we had no strong disagreements as to what the cooperative projects would be.
>
> As the plan the subcommittee developed for the ninth grade integration project between English and vocational education was implemented, the vocational teachers complained that it was too much. The vocational teachers felt they could not cover what they needed to in their classes and have the students out of class so many periods working on the integrated project. At the end of the first year, the subcommittee critiqued the activities of the project and decided to drop some of the time the students had spent in the library. The English teachers agreed that the time being spent in the library by the students was more than was needed for the short papers they were to write.
>
> The vocational teachers were frustrated because they knew that the students could produce what they needed them to produce, and the English teachers

> could see that the students could possibly prepare technical papers related to their vocational areas. One of the comments from two of the English teachers, however, was "How can I grade the content of a student's paper if I don't understand what it contains?" The third English teacher said that a technical paper should be written to the intended audience. This is a fourth-quarter project which the students are doing now.

An administrator reported on a project coordinated between vocational and English teachers at another school site. Here are the administrator's comments:

> The teachers decided to start a senior project. It was to begin on a pilot basis with senior students in the vocational teachers' classes. An English teacher worked with the vocational teachers to design the project. Not enough time was spent planning the project. The vocational teachers and the English teacher should have spent more time structuring the project before it was initiated. Thus, confusion among the teachers surfaced; for example, they did not know how to grade the students. Some of the teachers felt that they already have enough to do. I (an administrator) also did not spend enough time planning the project evaluation with the teachers. The project would have turned out better if more planning had been done before it started. It would have gone even better if the project had been planned this year and initiated next year. The concept of a senior project is just great. It is integration of academic and vocational education personified.

Instructional Strategies

Building on cooperative efforts and curriculum strategies was a third stage of integration: *Instructional Strategies*. Vocational and academic teachers approached the integration of vocational and academic education using a variety of instructional strategies. Most of the events associated with instructional strategies were provided by vocational and academic teachers. Administrators and counselors rarely talked about instructional strategies during their interviews. The following seven subthemes emerged from the Instructional Strategies theme:

1. Incorporating Vocational/Academic Skills in Instruction
2. Approaching Instruction Through Application
3. Handling Student-Initiated Instruction
4. Teaching Cooperatively
5. Using Common Teaching Strategies

6. Teaching As Teams

7. Using Community People/Resources in Instruction

Incorporating Vocational/Academic Skills in Instruction

Both the vocational teachers and the academic teachers talked about incorporating vocational and academic skills in instruction. A health occupations teacher commented about how an English teacher incorporated health terminology in the English class:

> The English teacher was teaching health terms in her class. The students were able to put the parts of words together into the primary vocabulary the English teacher was teaching to understand the terms. The English teacher did not have to get into deep teaching because these students already learned the information in my class.

In another event, a science teacher explained how she was utilizing the computer skills of the business students:

> As a science teacher, I am using computers for a lot of labs and simulations and to solve a lot of problems. I teach an applied physics course and most of the students are studying business. It makes sense to me that these students should utilize their computer skills in my class.

An auto mechanics teacher discussed assigning his students to write business letters:

> As a review for the safety unit, I assigned the students to write a business letter as a representative of an insurance company who had found safety violations in an auto mechanics business. In the letter, the students were assigned to outline the safety violations and then summarize how to remedy the violations. The safety violations had to be real world problems. I asked the students to write about hazards that might be extraordinarily dangerous. This assignment worked well for me because it provided an opportunity for me to find out what the students knew without them having to take a test. It gave the students a chance to review the safety materials. I assigned them to work in groups of four to five. It helped the students because they were able to just sit and discuss the safety issues. There was a lot of interchange of information among the students.

Another auto mechanics teacher explained that he was not successful in trying to incorporate writing skills with the students' knowledge of engines:

> I made the assignment to the students to describe in writing an engine. The students did nothing. It suddenly occurred to me that the students might not work as well independently. The students were crying out for direction.

> They wanted more guidance than I was giving them. I gave them free rein. I was trying to incorporate writing skills with their knowledge of the engine.

Approaching Instruction Through Application

Academic teachers were particularly excited about approaching instruction through application or using a hands-on approach to learning. One academic teacher talked about how an auto mechanics teacher helped him understand how to help students apply concepts:

> I was really frustrated the first month I taught. However, the auto mechanics teacher and I started talking and he helped me tremendously. In fact, when he could, he sat in on my lectures and then discussed with me where he felt the students were having trouble. He understood how the students learned, and he helped me in switching to an applied approach when I teach. My typical way of teaching would be to explain the principles and concepts first, then have the students apply them in their labs. I would not necessarily tie the concepts I was teaching to what they would be doing in the labs. Then I switched, and taught the application first and the principle or concept next. The principles of technology students were the ones who were turned off by science and seemed to particularly dislike math. Now when I want to teach them something like exponents, I start by showing them how the lab experiment they will conduct requires the use of exponents. For example, the readings on the meters they will be using will not be useful since the readings are such small numbers that they cannot be compared except through the use of exponents.

In another event, a math teacher talked about how he worked with the principles of technology teacher to apply math concepts to technology or science:

> In Algebra, I have been teaching math concepts and then going into the Technology Laboratory or the Science Department to demonstrate how to apply these concepts with technology or science. So, instead of teaching the Cartesian coordinate system in the traditional way, I took both of my algebra classes into the technology laboratory. The principles of technology teacher introduced the milling program. He then gave the students the task of milling their names. Obviously, everyone had a different name, so the student could not copy from one another's work. The students had to follow a series of procedures. They had to learn about the X, Y, and Z coordinates.

All of the attempts to approach instruction through application were not successful. In one event, a business teacher expressed her frustration in teaching comma rules:

> In my business systems class, I was teaching a unit on the use of commas. I presented some of the comma rules to the students. Then, I always like to

> have the students apply the material that I just presented. So I gave the students a simple business letter with no commas. The students were assigned to insert the necessary commas according to the rules I had just presented. These students had already covered a unit in the use of commas in their English classes. Evidently, the English teacher had presented the comma rules a little different. Some of my business students could not understand my rules. I think that some of the students may think that only one set of comma rules is correct.

In another event, a principles of technology teacher explained that he was unable to successfully teach trigonometry through application:

> I assigned the students the task of calculating how high in the air they were flying their kites. I provided the students with the procedures for determining this. What I did not tell the students was that they were using trigonometry. About a week into the students working with my procedures for determining how high the kites were flying, I had one student come to me and say that he did not understand the procedures. One of the other students said, "Well, it is just simple trigonometry." This student and probably ten others freaked and said they could not do trigonometry. They said they never had the course. They quit doing the exercise for determining how high the kites were flying. I think the students had a mindset that they could not accomplish trigonometry. But what was amazing was that the students were three days into accomplishing the task.

Handling Student-Initiated Instruction

In a few events, principals and academic teachers shared information about how students initiated an integration process. One principal talked about how a student worked with four teachers in writing one paper:

> Not long after I came to this school, the teachers told me of their working together. In one instance, four of the teachers worked with a student on one paper, each of them giving the student a grade for the paper. The four teachers were the English teacher, the biology teacher, the agriculture teacher, and the computer teacher. Students are pretty enterprising. When the student realized that the English term paper he was preparing could be used for his other classes, he approached the teachers to see if they would accept the paper in their classes as well. Teachers often work in their own little worlds and don't want others to infringe on their territory. In this instance, they respected one another enough to accept work in their classes that was being done in part for other classes. I told the teachers involved that this was really a nifty thing to do, something that takes a big person as a teacher.

Another principal discussed how a student tied an English assignment to his interest in auto mechanics:

> An example of integration between an English teacher and the automotive laboratory teacher is when a vocational student chose to demonstrate what it takes to repair a car's dented fender as an English project. The student wrote a paper on the fender repair procedure with input from the automotive teacher. The student then brought a fender to the English classroom to use during an oral presentation. The automotive teacher reviewed what the student would be demonstrating to the English class.

In another event, a math teacher recalled an incident when a student assisted her with teaching a math concept that the student had already learned in his auto mechanics class:

> I had never used the math tools called vernier calipers and micrometers. However, I learned that the auto mechanics teachers use them all the time. In addition, the industrial materials and processing classes use these tools. For example, the vernier calipers measure diameters and circumferences, and the micrometers measure the same types of things but in smaller units. One day I had an auto mechanics student in my math class recognize the vernier calipers and micrometer concepts that I was trying to explain to the students as a unit of instruction. I was doing a real poor job of teaching the use of these tools, and I was very uncomfortable. I was trying to teach how to use these tools from the book and it was not working. Then the auto mechanics student showed the class how to use these tools.

Teaching Cooperatively

A majority of the events coded under the *Instructional Strategies* theme were further coded under the subtheme titled *Teaching Cooperatively*. Examples of *Teaching Cooperatively* included making joint assignments, grading joint assignments, and teaching units at the same time. As the following event is described, business, math, and accounting teachers worked together to teach students how to prepare income tax returns:

> Many of the students are working part-time and need to prepare income tax returns. The business teacher, math teacher, and accounting teacher planned and conducted a joint teaching activity focusing on income tax return preparation. We each agreed to present a part of the income tax return preparation unit. In my business classes, I first asked my students how they were going to complete their income tax returns. The students said that they would have to take the returns to someone else to do. So I taught the students what was important about preparing income tax returns and they then actually practiced how to fill out the forms.

A business teacher explained how she worked with English teachers in teaching students how to write reports:

> If students in the English classes were writing reports, I taught the students at the same time how to type reports. We business teachers sometimes needed to make adjustments to our schedules to coordinate this type of activity. In the business classes, the teachers sometimes had to skip around a bit when planning, but not to a great extent and no problems resulted in my classroom from the changes. Some differences existed between what the English teachers wanted and what the business teachers taught. For example, the title page the students were doing for English was not the same as they learned for business. The business teachers, therefore, had to adjust. I told the students that if they had no other instructions, the way that I had shown them was a good way to do a title page; however, if they were told to do it a different way by their English teachers, they should do so to avoid getting it wrong. There are a lot of correct ways to do a title page. Sometimes to straighten things out between me and the English teachers, we had to talk things out.

In two separate events, business teachers talked about how they worked with English teachers to improve students' writing:

> After the students finished writing the rough draft of the letters, I asked the English teachers to review them for grammar while I reviewed them for content. The English teachers were more than happy to help me. I was surprised. I figured that this would just be another burden on the English teachers.

> During the unit, the students learned how to prepare their résumés using a word processor and also how to develop a set of basic personal information that was not included on their résumés. Instruction sheets had been prepared to assist students in the development process. Students were allowed to work on their résumés in my class and the English class. The English teacher assisted by checking the accuracy of the content and format.

A government and law studies teacher talked with an automotive teacher and asked him to come to her classes to discuss strategies for buying cars. The government and law studies classes were covering units that addressed consumer problems:

> One activity that worked out particularly well was when the automotive teacher came to my government and law studies classes to discuss how to buy a car. Students in these classes were working on units involving aspects of consumerism. The automotive teacher has been a car sales representative himself and knows a lot about the subject of car buying. He answered questions that I had the students prepare prior to his visit as well as questions that arose during the visit. He told the students some things I did not know myself about buying a car. For example, you can get a better radio for less money from stereo specialists than from car dealers. If I had said the same things as he did, the students would not have given them as much weight. Topics the auto mechanics teacher covered with the students included how to deal with car sales representatives, how to ask questions, and what to look for.

Some cooperative teaching did not work out perfectly. An English teacher realized that a problem existed when teaching cooperatively with vocational teachers. They were having difficulty with the transfer of papers between English teachers and vocational teachers. As the English teacher commented,

> Getting the information interview papers from the English teachers to the vocational teachers has not been a success at any point. The transfer of papers has not been a total failure, but it has not been a success either. The process of getting the papers from the English class to the proper vocational teacher in a time frame that we all agreed on and that we all remembered is not always easy. Students in all my classes have different vocational teachers and there may be different due dates because of the way information is being presented. Students in my English classes do not learn of the joint assignment at the same time. I think the coordination of due dates and the presentation of the assignment is as much of a problem as the content of the assignment.

A health occupations teacher told of her frustrations in teaching cooperatively with a chemistry teacher:

> The chemistry teacher and I both taught the metric system in our classes. We thought we were doing an integration process. However, what I taught and what the chemistry teacher taught did not integrate at all. I found this out partially through what the students told me and partially when the chemistry teacher and I would meet to write up the integration process. When we met to write up the project, we discovered that we did not know what one another was doing. This made us feel like fools. I particularly felt foolish because I emphasize good communication skills to the students.

Using Common Teaching Strategies

At two different schools, vocational and academic teachers shared information with one another about teaching strategies. A math teacher explained that she used the industrial arts teacher's approach to teaching rulers:

> I had always had students who were having trouble reading rulers. However, after having talked with the industrial arts teacher and using his approach to teaching rulers, my students who had a course with the industrial arts teacher recognized that we were using the same approach to teaching how to use rulers. I told the students that the industrial arts teacher showed me how to teach the use of rulers.

An English teacher told about how she helped an auto mechanics teacher with making a student writing assignment:

> I shared with the auto mechanics teacher strategies I used in making a student writing assignment. The auto mechanics teacher told me that this writing assignment was one of the best things he has ever done. He noted that the assignment opened up a number of what he called teachable moments. For example, the students were making up zip codes for their letters, so he brought a zip code directory to class and helped them learn to use appropriate zip codes. In another instance, the students wrote a letter citing a worker's smoking of marijuana. He was then able to discuss the implications of drug use in the work place.

Teaching As Teams

Vocational and academic teachers in the school sites visited worked together in a variety of team combinations as they taught students. The combinations included math and mechanics teachers; physical science and mechanics teachers; English and business teachers; English and automotive teachers; English and metals teachers; English, math, and vocational teachers; and English and trade and industrial teachers.

Team teaching between the vocational and academic teachers in these events took place in a variety of ways and in a variety of settings. A physical science teacher described the process of team teaching with an auto mechanics teacher:

> The auto mechanics teacher and I team teach the Principles of Technology class, which has twenty-eight students in it this year. We have been on the same frequency from the start; basically, he runs the labs and I take care of the math. We use the CORD materials and we work together to be sure we are helping the students at the same place, whether it is with Ohms law in electricity or whatever. For example, if the students know how to calculate voltage and current but not resistance, then the auto mechanics teacher works with them on resistance in their labs at the same time that I am teaching the calculations related to resistance. What the mechanics teacher and I do before and after class is constantly talk about what we can do to help the students; we focus on areas where they need help.
>
> The way we team teach the class is that the first day of a unit, we two teachers introduce it together. The next day we start the labs with the auto mechanics teacher taking half of the students to work on the equipment, while I lecture and do worksheets with the other half. Then the next day we reverse and I lecture and do worksheets with the other half of the students. This procedure usually goes on for about six days as each unit has about three labs. Then, the mechanics teacher and I pull the students back together and work with them to review for their test on the unit.

A carpentry teacher talked about how he and a math teacher worked together to help students build a conference center building:

> The carpentry class was a part of a team of students and teachers that built a new conference center building. Math is an important part of this process. For example, before we pour the floors, the students, math teacher, and I talk about concrete, cubic yards, and how to compute cubic yards into lineal feet. The math teacher shows the students how to compute the concrete. And even before we order the concrete, the math teacher helps the students figure out the size of the area and how much concrete we are going to need. The students work right along with the math teacher. I always think it is great to work along with the math teacher.

Another example of team teaching described by an auto mechanics teacher working with an English teacher was initiated because of a concern about the lack of job interviewing skills among the auto mechanics students. While the majority of the events about team teaching took place in laboratories, this event took place in an English classroom:

> The automotive students did not seem to be able to present themselves favorably at all when they went for interviews. The English teacher and I then decided to work together to demonstrate interviewing procedures through a set of mock interviews. We developed three different scenarios. The English teacher did the interviewing and I played the role of interviewee. First, I was very positive and nicely dressed; second, I was disheveled and had my hair a mess; and the third time, I acted very unconcerned and uninterested. The interview skit was done during English class and the students acted very interested.

Using Community People/Resources in Instruction

In a few events, principals, counselors, and vocational and academic teachers commented on using community people and community resources to assist in instruction. A counselor discussed inviting people from the community and the vocational center to talk to students in senior English classes about job interviewing skills:

> In each senior English class, the students learn how to prepare résumés, fill out job applications, and participate in interviews. In order to accomplish this, I call people in from the community and resource people from the vocational center to talk about interviewing skills.

An English teacher talked about getting her students involved with meaningful writing activities involving the community:

> I want my students to be involved in writing activities that are meaningful and involve the community. Working with the kindergarten and first grade students has proven to be ideal. These young children participate eagerly with my students. My students write stories for them and become their pen

> pals. When the children came to the high school, I had to find something for them to do for the periods they were not with my students. I sent notices to other faculty asking them to have the kindergarten and first grade students visit with their classes. The vocational teachers were the main ones who responded to my request. The activities they planned for the children were wonderful. For example, the agriculture classes provided a zoo, the broadcasting class videotaped the students, the photography class took their pictures, and the industrial arts class prepared wood puzzles for them. The art class did silk screen T-shirts for the children.

An agriculture teacher told how he and a biology teacher involved the local fish hatchery technician in providing instruction to students:

> A technician from the local fish hatchery was available to help the students with the agriculture project. He came to the school for two days to help analyze the fish parasite problem and instruct the students in microscope use. It actually turned out that the problem was within the fish. The first day was an instruction day on what the parasites look like. He used some of the fish he brought with him with known parasite population as examples. The second day was actual hands-on laboratory techniques of catching the fish and determining what fish were infected and what fish were not infected.

A principal realized that presentations made by business people at the school were well-received by the teachers:

> All of the teachers gave positive feedback to me after the presentations by the business people. The presentations by business people were particularly effective in allowing the students to hear from professionals about how English is used in the business world.

A drafting teacher talked about how a representative from the Federal Aviation Commission assisted him in making a writing assignment:

> When I first started journal writing as a part of the portfolio assignment, the students displayed a lot of resistance because they wanted to be drafting. They did not want to be writing. One day I had a representative from the Federal Aviation Commission come to speak to my class and a student asked the representative if she thought that journals were important. The representative held up her journal, which was about an inch thick, and said "I write in my journal every day." The speaker explained that she writes up all the details of what she does every day. This was a turning point with the students. Now they don't even question their journal writing assignment. They just do it automatically. The students were receptive to the writing assignment once they could see that they were going to get some good out of it.

Administrative Practices and Procedures

Although some persons may perceive administration to be quite remote from teachers' roles in the integration process, administrative practices and procedures in the schools we visited appeared to impact teachers' roles immensely. Administrative practices and procedures were viewed as contributing to Cooperative Efforts, Curriculum Strategies, and Instructional Strategies by fostering a positive climate for integration. Numerous instances of administrative activities could be linked to integration. Most events related to this theme were provided by school principals and other administrators. However, during their interviews, some teachers discussed administrative practices and procedures from their professional perspectives.

Eight subthemes emerged from an examination of the *Administrative Practices and Procedures* theme. The following four focus most directly on development of integration:

1. Facilitating the Integration Process
2. Dealing with Administrative Constraints
3. Handling Teacher Concerns
4. Learning from Experience

Four additional subthemes focus on improving the administrative process:

1. Scheduling Classes/Organizing Classes
2. Dealing with Teacher Resentment
3. Involving Teachers
4. Seeking Administrative Support

Facilitating the Integration Process

Administrators in the schools we visited facilitated the integration of vocational and academic education in a variety of ways. One of the most common approaches administrators used was team building. Vocational and academic teacher teams often began as committees. As one vocational teacher stated,

> Three years ago, the administrators formed a committee of English and vocational teachers to outline projects that students would complete cooperatively in the vocational and English classes. The projects were to be completed over all four years that students were at the school: freshman through senior years.

Administrators seemed sensitive to the need for a variety of teachers serving on committees and thus identified and selected committee members from both vocational and academic sectors of the school. When discussing the formation of a committee, one principal said the following:

> Three or four years ago the administration at this school pulled together a group of teachers for a half a day to discuss the freshman writing project to see if the assignment could be modified. When putting together the group, the administration chose one positive and one negative person from English and from the vocational curriculum.

The team building process could take many forms. After working with teachers on integration for a period of time, one principal became dissatisfied with progress and decided to link professional development activities with the establishment of a teacher team in the school. The principal noted,

> One area that I was not real happy about was lack of movement to move the instruction to a more applied approach, one that integrated academic and vocational education. Changing the way instruction is delivered is hard to do; it is hard to break down old paradigms. Thus, I formed a team of leaders from vocational and academic education. The team members attended the Southern Regional Education Board-Vocational Education Consortium staff development conference. Following the conference, the team had a two week work session held at the school to write applied curriculum. The charge I gave to the team was for them to come up with significant integration activities that they could implement.

Administrators also organized professional development activities for teachers at the school and across the school district. One of the most powerful ways to provide professional development was for teachers to teach teachers. As one English teacher commented,

> Teachers from the entire county were invited to come to the high school to learn about applied communication. The administration asked me and another English teacher to provide the inservice program because we had been working with applied communication longer than the other English teachers in the county.

In several instances, administrators asked vocational and academic education teacher teams to provide professional development workshops for other teachers in the school.

Administrators also facilitated the integration process through scheduling. This included student as well as teacher schedules. With regard to student scheduling, a principal commented about how student scheduling was organized at an academy (school-within-a-school) at a high school:

> Last year the academy students all took math and English at the same time. For example, third period they all had English. Thus, when the business department would have special presentations, the teachers would pull the business students out of both business and academic classes to attend.

With regard to teacher schedules, one administrator described how a rather simple schedule change paid off with great benefits for integration in the school:

> In addition, we scheduled the academic teachers for a planning period during one of the last two periods of the day. Most all of the vocational teachers are free during the two last periods. This allowed the academic and vocational teachers to meet during a common time. The teachers do utilize this time to meet. Another outcome is that this school now has one lunch period. The teachers feel this time is just as beneficial to share information with one another.

Another way that administrators moved toward implementation of integration was through teacher empowerment. Some administrators seemed to recognize that opportunities must be provided for teachers to become the owners of the integration process. One school administrator said,

> When the administrators first got the grant for the vocational and English teachers to work together, they tried to stay out of the implementation stage as much as possible and to make the cooperative efforts ones (that were) owned by the teachers.

Administrators occasionally needed to give teachers assignments and prod them to move ahead with integration. Although this approach may appear to be autocratic, teachers did not seem to rebel. When commenting on a task assigned by administration, a vocational teacher expressed frustration about doing the assignment:

> The five committee members were selected by the administrators to write the articulation program between the vocational courses and the English courses. Before the first meeting of the committee, I said to myself why me, thinking to myself that I didn't luck out again.

This teacher eventually began to enjoy the committee work and ultimately appreciated the opportunity to work with English teachers and learned in the process.

A counselor commented about an occasion when administrative intervention was needed during the integration implementation process:

> The committee then discussed what should be changed and how the electronics objectives could be linked with the academic classes. The vocational teachers expressed frustration and the academic teachers seemed most receptive. Most of the committee supported the changes until it came to their own subject matter. Then they were resistant. Sometimes administrative directives were needed to make the changes.

There was some evidence that administrators worked with counselors to facilitate the integration of vocational and academic education. A vocational teacher stated,

> The Principles of Technology class now has a cross section of students in it, from some of the best to some of the weakest. I believe that our principal has worked with the guidance counselors to change their perception of principles of technology being for low-level students and has encouraged them to enroll students in it who can benefit from the course. Principles of Technology is an excellent course to prepare students for physics and advanced math.

In one instance when progress was not being made, there was a felt need to step in and give teachers an ultimatum. As one principal put it, "The freshman writing project was not working out the way it was intended. The administration told a group of teachers that if they were going to only do the job halfway, then the project should be discontinued."

Dealing with Administrative Constraints

When engaged in the integration process, administrators were sometimes burdened by constraints that originated from within and outside the school. Although administrators sometimes expressed concern about these constraints, they did not appear to be discouraged by them. Constraints ranged from logistics to meeting teacher and student needs. In fact, one administrator confided that the implementation of integrated programs was a condition of employment: "When I was hired, I was hired specifically to implement the integration of vocational and academic education. I was to start slowly, working first with the vocational teachers, and then involve the academic teachers."

Sometimes, teachers recognized the constraints that administrators had to deal with. As a vocational teacher put it,

> The system that we have of pulling students out of their academic classes was an administrative decision. The reason for the decision was to maintain vocational enrollments, since a lot of students cannot give three periods a day to a vocational class and still meet academic requirements. Further, the decision was based on such things as transportation costs.

Other teachers commented on the administrative constraints associated with integration. With regard to the pull-out approach mentioned, a different vocational teacher commented on the complexities of meeting student needs:

> With the pull-out system, there has been some alteration in the English course, but very little is related to the needs of the vocational students. This semester, for example, they are studying Shakespeare, something I feel they should be getting at their home school.
>
> I think more students could benefit if the English and math teachers came into the vocational classrooms rather than just helping students that were pulled out. The students that are pulled out are also missing things in my class. It is difficult to structure the occupational child care class to include the students missing that much time.

Another constraint was the granting of credit for applied studies. In one instance, although students received credit for applied English studies offered at a vocational center, this credit did not count as English credit toward graduation. In an effort to deal with this constraint, one administrator gathered information and then set up a meeting with the superintendent of schools:

> After the English program was initiated, we examined the results and said to ourselves: look, these things work. Here are our research results and these are the responses from our students and this is why we would like the board of education to grant credit for the program. At the time, I felt extremely frustrated because there was no acknowledgment that credit was important. The teachers felt frustrated as well. A group of interested persons (administrators and teachers) scheduled a meeting with the superintendent one day in the school resource center to discuss our request. At the time, a group of teachers, perhaps eighteen in all, wanted to be involved in letting the superintendent know why we wanted credit for the program.

The meeting went extremely well and the superintendent supported the proposal to grant credit. Eventually, this particular constraint vanished.

Personnel-related activities also seemed to emerge as constraints. With regard to a newly hired teacher, one administrator admitted that difficulties emerged from a situation when proper action was not taken:

> On the surface, the scheduling of the new teacher without preparation to teach applied communications involved only two individuals, the new teacher and the previous applied communications teacher. Yet I can see that a lot of ground was lost by my not applying the leadership for a smooth transition of the applied communications course to the new teacher.

Sometimes, the personnel situation became rather frustrating and complex. As one principal commented,

> In the applied math area, there were some problems. The teacher that taught the applied math course the first year was excited about it and did an excellent job but could not teach it the second year because of certification problems. So the next year a beginning teacher taught the applied math course. There was no time to get this person trained to teach applied math. Last year, another person taught the course. She had a nervous breakdown so we had to switch teachers in mid-semester.

Handling Teacher Concerns

Handling Teacher Concerns emerged as an additional subtheme. These concerns, which were few in number, centered on students missing classes, provisions needed for project coordination, and teacher concern about the impact of integration. With regard to students missing classes as a result of a pull-out system, a cosmetology teacher commented,

> a cosmetology demonstration can take more than two hours and some of the students have to leave in the middle of the demonstration. The same thing has happened when I have had speakers come to the class. I am concerned about the pull-out method for academics because students are in and out of my cosmetology class and are missing blocks of information.

A vocational teacher at another school expressed concern about how integration projects were being coordinated. This person said,

> After the cooperative projects were worked out between the academic and vocational teachers, no coordinator was assigned to follow up the projects to make sure that they were being carried out. As a result, some teachers were implementing the projects while others were not.

It was apparent that administrators tried to be responsive to teachers' needs. As a different vocational teacher stated, "The administrators now schedule a meeting at the beginning of the year for all English and vocational teachers. We go over the outlines for the projects for all four years. Now the projects are going much more smoothly."

At a third school, an English teacher was concerned about the movement to integrate vocational and academic education and apparently was not ready to accept change. As the school principal indicated,

> He (the English teacher) met with the board and told them that if they tried to institute the integration of academic and vocational education, it was going to be the ruination of the school. . . . I think the English teacher was sincere when he filed the grievance. He thought we were doing things that were bad for the kids.

However, in the end, everything turned out alright. After the teacher had an opportunity to work with integrated programs for several years he ended up being one of integration's most vocal supporters.

Learning from Experience

Perhaps stimulated by our request to discuss an event in the past where, due to hindsight, things would be changed; several administrators noted how they had learned from their experiences working with integration. Comments related to this theme indicate that some administrators were not fully prepared to deal with the complexities of integration. For example, one principal felt that a good job was being done with implementing integration and then found out that there were communication problems:

> When I realized what was happening, I just kind of kicked myself. I thought that I was communicating because I thought I was a people person. But I couldn't go back and change history, so I didn't dwell on it. But I knew I had to fix it. This all happened in the spring. So at the start of the academic year, I called a meeting and told the faculty that we had to get moving on this integration or else the students were going to suffer. I had a speaker in that day who talked about the necessity of change and about putting things behind you, and we went forward from there.

Another principal recognized, in retrospect, what should have been done with integration but was not done. This person made a personal commitment to move forward with the process:

> A science teacher that was trained to teach principles of technology and had been teaching this course to students in the high school decided to resign. After this teacher resigned, the ball was dropped and the school did not move ahead with the basic skills project very much. This was primarily because I was a new and inexperienced principal and the superintendent was also new.

> Reflecting back, I wish that we had started the applied courses sooner and had the principles of applied technology and applied communication courses in place right now. We need to get the principles of technology course started up again and get the teachers more involved.

One administrator spoke about what had been learned through the integration process when attempting to break down barriers that existed between teacher groups. This person commented,

> If I knew then what I know now, and could go back to where we began, the teachers would have moved a lot faster into interaction between the vocational center and the high schools. The natural barriers between the two teacher groups would have been eradicated and application of materials would have been learned sooner.

Many of the events related to administration described by interviewees were either quite positive or ended on a positive note. However, a number of interviewee comments were not as positive. These comments, which were largely drawn from interviewees' second events (where they were asked to describe something in the past that did not turn out very well), could be grouped into four subthemes: scheduling and class organization, teacher resentment, teacher involvement, and administrative support. Each of these subthemes provides a starting point for determining how the administrative process might be modified to improve the integration of vocational and academic education.

Scheduling Classes/Organizing Classes

With regard to scheduling, a principal was quick to comment about how student scheduling was detrimental to the integration process:

> As a result of many levels of math students in each business class, there is much less integration of activities between the vocational business courses and the math courses. More integration exists on paper than in reality. The math integration activities have occurred on a low level only.

Commenting on the pull-out approach where students are pulled out of their vocational classes to attend academic classes, an academic teacher commented,

> The vocational teachers are one-hundred percent in favor of a system that reaches one-hundred percent of the students. These teachers have students who might leave their class at the beginning of the period and come back somewhere in the middle of the period. This is rather chaotic. The math teacher and I feel that we should be in the labs teaching all the students. We

> feel that the pull-out model is, at best, disruptive and only twenty-five percent effective at this center.

A counselor described a problem with student scheduling that appeared to affect learning: "One of the problems with the integration is with the scheduling; for example, all of the auto mechanics students are together in their academic classes and sometimes they tend to socialize instead of learn in their academic classes."

This same counselor described another adverse effect of the scheduling process:

> Due to scheduling academic classes around vocational class schedules, a large shop class of twenty to twenty-five students sort of travels together and becomes a total group. These students are together all the time and that is the biggest problem we have with the clustering concept. The academic teachers sometimes find that students carry disagreements to the academic classes from their shop classes.

Dealing with Teacher Resentment

As integration was initiated in the schools, there was naturally some teacher resentment toward the process and how it was being administered. As an academic teacher stated,

> When I began teaching language arts at the center, I sensed a lot of widespread resentment among the vocational teachers. A large percentage of the teachers felt a great deal of resentment about implementing the program and there was a great deal of confusion. For me there was also a great deal of confusion as I did not know what to do from one day to the next. So if I do not know what I am doing, how in God's green earth could the vocational teachers know what to expect.

Of course, teacher resentment was often communicated to administrators. As one principal put it,

> I thought I had full support of the committee, however I did not. So when we came to the third year where we dissolved the departments and formed clusters, a number of problems surfaced. The clusters were a major disaster, and I could really feel the resistance. I heard a lot of comments from the academic teachers that they didn't feel curriculum changes were needed.

This same principal then commented about why the situation evolved in the way it did:

> I was so blinded with the great new idea that I thought everyone would want to jump in regardless of how much work was involved. I was naive in thinking that this would be the case.

A principal at a different school spoke to the reason behind teacher resentment toward integration. In this instance, the principal and other administrators in the school had chosen to work primarily with academic teachers when the integration process was first started:

> The vocational teachers, approximately twenty-five of them, did not seem to be upset or resistant to what I was talking about that day. Later, however, when I scheduled other meetings, the vocational teachers did not show up and I heard, not directly since I am the principal but through the grapevine, that they were making a number of negative comments about the proposed changes in their instruction. The vocational teachers were uncomfortable meeting with the academic teachers, with any type of change for that matter.

Involving Teachers

Some teachers that were interviewed felt frustrated about not being included in enough integration activities or not having enough time to work with other teachers. Time seemed to be an important concern for teachers. An academic teacher put this problem in perspective, saying the following: "No school can make the changes we have here if time is not provided for the vocational and academic teachers to sit down and work together. I cannot change curriculum by working with other teachers at the end of the day."

In a more specific vein, a vocational teacher expressed frustration at the lack of time available to work in curriculum planning:

> Unfortunately, the applied communications teacher and I do not have common planning time and here it is February and we have not been able to get together and work out the details for implementing the project with our students. Doing cooperative projects between teachers is just so time consuming. This project would be wonderful for the students if we only had time to work on it.

A vocational teacher at another school spoke to the need for discussion time at faculty meetings:

> The agenda at our faculty meetings is usually highly structured and we have no time for faculty to share. When the vocational and academic teachers do

> finally get together at these meetings, we focus on the agenda items with little concern for what has been happening with our students or where we would like to go with improving our instruction.

And an academic teacher at that same school commented rather forcefully on the lack of time available to share ideas:

> The teachers have never had an opportunity, it seems, to share information about our courses here at the school even though a number of teachers are teaching new and different things. It would seem that for some of our inservice days we could take time to share with one another what is going on in our classes.

Frustration was also expressed with not being included in the integration planning process. At one of the schools visited, it was noted that teachers were left completely out of the process. An academic teacher shared comments about this problem:

> The next thing the vocational teachers knew, they were asked to attend a week-long seminar and told "you have your English and math teachers. Now how are you going to use them?" But the teachers were not allowed to plan in committee what the best way was to implement the program. . . . The teachers threw up their hands and said "Well, everything is decided. Why are you asking us now?"

Frustration was also expressed about the lack of long-term involvement with other teachers. As one vocational teacher lamented,

> I have never met with the other academic teachers that attended the week-long workshop again. I would like to see the academic teachers visit our center to see our setting and get the big picture of what we do. Further, we should go to their classes as well. I think the vocational and academic teachers should have regular seminars together and talk.

Using hindsight, administrators at two different schools commented on what should have been done to resolve some of the problems associated with teacher involvement:

> Getting the vocational teachers to accept the academic teachers took three years. I feel this time could have been shortened if I had involved more of the academic community sooner.

> Rather than waiting until the middle of the year or in addition to meeting during the middle of the year, I wish I had initiated a lot more of the teaming or team building before school started to talk about the integration of academic and vocational education. Instead of the teachers considering this

project on an individual basis, I feel that more team building would have been beneficial.

Seeking Administrative Support

Interviewees commented on several problems related to the lack of administrative support for integration. Vocational and academic teachers at three different schools expressed their feelings in rather blunt terms:

> The support needed from the administrators was not there. When administrative support for change is weak, nothing happens; when it is too strong, teachers rebel.
>
> Efforts to integrate between the vocational and English teachers are still not as strong as desirable. The teachers are still paying for the lack of coordination on the projects, particularly on start up.
>
> Projects like this need someone in charge, someone to check with the teachers and ask how the projects are going and if students are coming to classes with needed information.
>
> Last year the teachers decided they needed someone to run the articulation process because the administrators did not seem to be able to help. If someone is not given lead time to coordinate articulation, we don't articulate. We need a manager. A manager is what we need most to make the articulation process successful.

Teacher Outcomes

Interviewees described a number of teacher outcomes related to integration. Most of these outcomes could be categorized as positive with only a few having negative connotations. The *Teacher Outcomes* theme could be further delineated into subthemes. These subthemes reflected growth, satisfaction, and/or recognition teachers achieved as a result of being involved with the integration of vocational and academic education. The six subthemes are as follows:

1. Recognizing the Value of Integration
2. Collaborating with Other Teachers
3. Growing Through Professional Development
4. Teaming with Others to Teach
5. Approaching Teaching in New Ways
6. Becoming a More Integrated Teacher

Recognizing the Value of Integration

Several instances were reported where teachers recognized integration's value. These "testimonials" not only reflected positively on teachers, but also pointed to the value that integration can have for students. The link between teacher and student is illustrated in the following comment made by a principal:

> With regard to the applied academics course, the mathematics teacher said "this is good stuff." The teacher indicated that the approach is a good way to reach students who have never been reached before. Now the students see a reason for studying math. The school has eliminated general math and replaced it with applied math.

An auto mechanics teacher, likewise, testified that integration was valuable for students:

> Because of the rapid changes in the automotive industry, I could not do without the help of academic teachers. I have talked to instructors from other schools that are not integrating and working in clusters as my school is and, quite frankly, I don't see how they can have an effective automotive program. Without the integration, the automotive students do not receive the supporting skills and information that they need.

At another school, an administrator described how an auto mechanics teacher recognized the value of integration:

> As result of the letter writing project, this automotive teacher has become one of the best supporters for including English in vocational classes. He came to teaching from a position as shop manager for an auto dealer. He said he now realizes that much of his success as a shop manager depended on his ability to write descriptive statements of what was being repaired on cars and using the statements as the basis for reimbursement from insurance companies and manufacturers.

An academic teacher commented on how professional development workshops contributed to a recognition of the value of integration:

> Once we teachers finally got our differences out of the way and started working in a positive direction, then administrators sent some of us to workshops related to applied math. After attending the workshops, other math teachers and I spent several days doing the labs ourselves so we could understand what the students would be doing. When it got to that point, I was getting excited and ready to teach the applied courses.

And, finally, a principal discussed a situation where an English teacher changed from being integration's biggest detractor to its biggest supporter:

> The English teacher went to the board and told them "I was here two years ago, and I admit that I was wrong. This is the best thing that has happened to education in a long time." I think that the integration of academic and vocational education we did at the school during that two-year interim was effective. To take your biggest detractor and make him your biggest supporter was a big plus.

Collaborating with Other Teachers

Teachers felt very positive about their collaboration with other teachers. A vocational teacher described the positive feeling he had when collaborating with a jobs teacher and a language arts teacher:

> I felt good about this activity because this language arts teacher was a tough nut to crack, but the jobs teacher and I, along with the students, convinced the language arts teacher that the vocational students would benefit from using the collaborative model.

Some teachers learned to appreciate collaboration only after they had been involved with it for a while. An English teacher gained such appreciation after working with business teachers. This person's comments also show how teacher collaboration can have a positive effect on students:

> I think the business teachers and I are learning as time goes on and we are going to have to help each other out. Each teacher is learning to adjust to other teachers' writing rules such as punctuation and the students are learning that when they get into business they are going to modify their rules to suit various employers' needs.

An academic teacher learned from experience that successful collaboration places certain demands on the collaborators. "I think revising the career assignment was very successful. It taught me that if there is some value in articulation, the teachers have to sit down together and articulate and work through their program assignments."

Growing Through Professional Development

It appears that professional development activities had some positive impact on teachers. Comments made by teachers and administrators supported the notion that

professional development can result in teacher growth. Two different vocational teachers indicated that attending workshops resulted in personal growth:

> In terms of the applied math materials, at first I had my doubts but after I went to a workshop I was turned around and now feel good about the program.
>
> As a result of the workshops, I was then able to use the techniques I learned in my electronics class and make my speech and math more basic.

Contrary to popular opinion, teacher inservice days can also contribute to professional growth. As an English teacher indicated,

> I felt good about the inservice day. The other English teacher and I probably talked for about five hours about applied communication and the integration of academic and vocational education. Before I started teaching applied communication three years ago I did not know any of the vocational teachers. Now, I know all the vocational teachers and have worked with most of them in some capacity in developing curriculum for my applied communication classes. I am so impressed with what the vocational teachers do in their classes.

In one school, inservice education was held each Tuesday. A principal described this activity and its value in some detail:

> This school has school-based staff development. Each Tuesday, the teachers use their planning periods for staff development. Different teachers provide information to others about what they are doing in their classes that is particularly effective. One of the general math teachers who has really resisted the change to integration is now one of the strongest proponents for it. He has actually developed two full books of integrated activities and has shared them with other teachers through the Tuesday staff development sessions.

Teaming with Others to Teach

Vocational and academic teachers were quite pleased about their team teaching experiences. Teachers from several different schools praised the approach and its impact on them:

> I (vocational teacher) want to spend more time working with the math teachers. I will work with integrating activities more. I feel good about what is going on in integration this year. It is good to work as a team.
>
> It takes a lot of preparation to team teach, but it's a lot more fun to have two people working together. I (academic teacher) love the way we (academic

> and mechanics teacher) are teaching; it is really an easier way to help the students.
>
> We need to impress on the academic community that team teaching is a viable way for students to learn language arts skills. I (academic teacher) have not followed up on these students in terms of how much they had learned, however, the metalworking teacher is enthusiastic about the program. I feel that the team teaching approach is the best and only way.

An academic teacher described a class that was team taught in collaboration with a vocational teacher, as follows: "The vocational teacher introduced the topic and I did the follow-up. I felt this was great. . . . I feel the students' skills had improved after I reviewed calculating interest, and I feel this was a successful event for the students."

Approaching Teaching in Different Ways

Several teachers were exposed to new or different ways of teaching—ways that they had not encountered before. For example, a vocational teacher described how students' communication skills were developed in a vocational class:

> If I want the students to write something, I ask them to explain a process they already know how to use to another individual who does not know the process. The students must then communicate to the other person so that everything is done correctly and accurately. The students then have to use their problem-solving and logic abilities as well as writing skills to communicate. I have seen students' communication skills improve in the classroom through the different approach I am using.

A math teacher, likewise, commented on some of the benefits accrued from teaching math in new ways:

> After having worked with the applied math, I feel the students view the math teachers differently. The students are pleased that I have taken an interest in learning more about what they are interested in. I also feel that the students have a better respect for the academics that are necessary to be successful in vocational classes.

And basic as it may sound, an academic teacher describes how vocational teachers gained an appreciation for using the library in their teaching: "This may be an incidental outcome but, for the first time, the vocational teachers learned about the library when they took their students there. Now many of them are strong supporters of using the library with their students."

Becoming a More Integrated Teacher

Although some of the events already cited reflect movement toward integration, this subtheme focuses on teachers' acknowledgment that change had occurred in the way their teaching is accomplished. As contrasted with approaching teaching in new ways, statements in this subtheme center on a change in mindset. As one academic teacher indicated, "I now have a concept of what the students are doing while in the shop classes. I did not really understand what all they went through in a day and now I do. . . . I now see how important it is to relate to what students are doing in class to the world of work."

An English teacher provides several interesting comments on how teaching has changed:

> I do a lot of reading. I went to a trade show last year so I could learn about new equipment used in the shop classes, and I learned about my students' co-op jobs. Now, I try as much as possible to relate what I teach to job skills the students will need. I took it upon myself to get out of the academic rut of teaching straight grammar, literature, and so on. I don't teach down to students at all; if anything, I now require more of them.

And, finally, a physics teacher described a personal transformation to becoming more integrated:

> Through the help of the mechanics teacher who team taught principles of technology with me, I was able to change my teaching style so that I emphasized the hands-on application of science and math first rather than the concepts and principles I normally emphasized first with my college-bound students. I have found that many students who cannot handle the math and science of physics as it is typically taught do very well when the material is presented in a hands-on, application-first approach. As a result of what I learned from teaching principles of technology and through the help of the mechanics teacher, I now teach a lot of things differently in my college-bound physics class as well.

Student Outcomes

The *Student Outcomes* theme focuses on the link between the integration process and student improvement and/or success. This is typically a testimonial about how instruction through integration helped a student or students in some way. The following six subthemes that emerged from the student outcomes theme:

1. Performing a Task Better

2. Transferring Learning

3. Making Better Grades/Passing a Class/Staying in School

4. Approaching Learning Through Application

5. Becoming More Competent or Proficient

6. Accepting Vocational/Academic Programs

Performing a Task Better

Students were often able to perform tasks better as a result of the integration process. A business teacher recognized the benefit to students when she worked with English teachers on a term paper project:

> The English teachers and I have a good working relationship. And it is so much easier for students to do a term paper on a computer than it is to sit down at a typewriter. The students have worked very well with all the teachers. In terms of benefits to students, they do not get as frustrated with the term paper preparation task. For example, when a student gets down to the bottom of the page using a typewriter and makes a mistake that cannot be corrected, it is much more frustrating than when a computer is used to correct the mistake. Instead of learning more about the mechanics of a typewriter, students can concentrate on learning about writing a paper.

A principal emphasized the benefits for a student to produce a high quality paper when four teachers worked together:

> The student benefited from having input from four teachers on a single project rather than just having input from one teacher. By the English, biology, agriculture, and computer teachers all helping the student with the same paper, the student was able to be more focused and to produce a higher quality paper than he would have if each teacher were requiring him to do something different.

Transferring Learning

Through exposure to integrated education, students were able to transfer their learning across several classes. A math teacher talked about students transferring their learning from health occupations class to a math class:

> The health occupations teacher and I integrated an activity to study diabetes. I had some students in my math class that had already studied diabetes in health occupations. So, when I presented diabetic material to my class, the students who already studied the subject got real excited. The students from the health occupations class started teaching the other students. Then, a diabetic student actually showed the other students how she took care of herself. For example, she showed the students how she tested her blood, how to cheat, and how to give herself an injection.

Another math teacher said that her students were able to relate the mathematical concepts she was teaching to their vocational classes:

> When teaching the applied math, I find that my students often mention that they can relate to what I am teaching because of what they have learned in auto mechanics, principles of technology, or agriculture classes. I like to hear that my applied mathematics course is relevant for the students.

A health occupations teacher told of how her students were better able to understand medical information and relate this information to real world situations after teaching a unit on medical terminology:

> I feel this activity has been good for the students. Now, when the students read the newspaper or watch television, they know what the medical terms mean. In fact, I have students tell me about watching television and understanding the medical terms. For example, the students understand about the President's medical problems due to knowing the meaning of the medical terms printed in the paper and talked about on television.

In another event, a vocational teacher told of suggestions for integration from the craft committee members related to students having difficulty obtaining jobs.

Making Better Grades/Passing a Class/Staying in School

A fairly common student outcome was that integration activities helped students make better grades, pass a class, or stay in school. A counselor referred to a student who was able to graduate because a physics teacher taught the student in an applied fashion:

> One student had failed a required course in his senior year and had to return for a fifth year to graduate. He wanted to take the physics course even though he really did not have the prerequisite skills for it. The physics teacher, however, agreed to have the student in the class and to help him. What the physics teacher did was use teaching techniques from the Principles of Technology class, which he team teaches with the auto mechanics teacher, to make the physics instruction relevant to the student. The teacher used techniques and concepts from vocational classes to help the student. The techniques included applied laboratories, workbooks, and

so forth to motivate the student. As a result, the student passed the physics class and graduated from high school.

An electronics teacher told of how he worked with a math teacher to help students stay in school:

> The math teacher was very, very helpful. He would teach the concepts from the academic perspective, not the shortcuts, and this worked out extremely well. The math teacher and I saved quite a number of students who would have, in all probability, either dropped out or flunked out of the electronics curriculum because their math skills were just not adequate.

At one school site, vocational and academic teachers worked together on a drop-out prevention team to help students stay in school. One teacher commented,

> The common planning time allowed the dropout prevention team members to discuss student problems and to devise ways to help students without the teachers having to resort to discipline referrals. I was proud and happy with the results of the team efforts. More than ninety percent of the students in the team's school with a school effort did not drop out. The success of our integrated activities went beyond our expectations.

Approaching Learning Through Application

Students responded to learning material that was made relevant. A drafting teacher explained how he made writing assignments relevant for students, as follows: "The portfolio assignment has been very successful. Writing just to be writing does not work for the students. If students can see some value in writing, they will do it without question."

At another school site, a principles of technology teacher worked with a math teacher to teach math through application:

> The math teacher and I have worked together and almost eliminated the question in Algebra I classes of "Where will we use this?" For example, after the hands-on exercise about ordered pairs, most of the students did not need the lecture on the concepts involved. They already understood. One particular student, who normally has trouble with math, really did a good job with this activity. This student understood the concepts. I think this student caught on fast because we actually gave him the hands-on learning. Apparently, the math makes more sense to him now because he knows how to use it.

An electronics teacher said that he had worked with a math teacher on making the math more relevant for the electronics students:

> The math teacher has noticed that by doing math on a more informal basis in the electrical construction laboratory, he has led a lot of students to take the higher level math because the students are not afraid of math anymore. The electrical construction students can see some relevancy between learning mathematics and what they are going to be doing in the trade area.

A principal relayed that the English and metals teachers worked together to teach indexing through practical application:

> I feel that the students were receptive to learning indexing because the English taught in this module was made practical. A lot of students have worked with indexes in English classes, but they have never worked with indexes in a metals laboratory. The metals teacher feels that students, who have not learned English in the past and were thought to be slow, can now learn the information through practical application.

Becoming More Competent or Proficient

The integration of vocational and academic education appeared to assist some students in becoming more competent or proficient. A math teacher, who taught masonry students math skills needed to estimate materials, provided the following comments:

> One of the students from the masonry class approached me outside of class. He was almost to the point of gloating. He was so pleased with himself. His father is a mason and the student had gone home and calculated the same problem he had done in class and showed his father how he had learned to estimate materials. The student quoted his father as saying, "You have learned in two weeks what it has taken me years of practical experience to learn." The student felt at that moment that he knew as much as his father. He felt successful and good about himself. This was a student who was not an achiever or honor roll student. He just barely gets by. I felt great about this success and that I had done some good. The masonry teacher was also very pleased. When we get a student feeling that good, you know you have given him motivation. We felt that we were doing something right.

A principal at a different school site talked about a student becoming proficient in math:

> A student enrolled in the high school with parents who were college graduates was a fun person to be around, but academically he was just not really involved in his studies. The student was, however, involved in the vocational agriculture program and FFA. This student was one who said "I can get by." During the second semester of last school year, the

> mathematics teacher, who was teaching this student applied mathematics, came to me and said this student was all of a sudden excited about the mathematics instruction. Because of the applied math course, this student ended up being enthused and had begun to go beyond just getting by.

A remedial math teacher discussed working with the remedial vocational teacher to help students become more competent in math:

> Once the remedial vocational teacher and I identify students that have problems with math and are really trying, then those are the students I want to concentrate on to help reach the ninety-five percent level on the math test. Some students may never score at the ninety-five percent level, but they are learning through the program. By the end of the school year, the remedial math teacher and I typically have well over fifty percent of the students scoring ninety-five percent or above, whereas we start the year with maybe one or two students scoring ninety-five percent or above.

Accepting Vocational/Academic Programs

Through working with both vocational teachers and academic teachers, students learned to accept the importance of information taught in these two areas. A principal had a conversation with parents of a vocational student who realized the importance of math:

> The student's parents indicated to me that the class and the teacher made the difference and that the student had decided academics and grades were important. The student is having a little trouble in an English class this year but he now wants to go on to college. The parents indicated that their son had no thoughts about going on to college until he took the applied math class. The student said that for the first time he had a reason for studying math and other academic subjects.

An electrical teacher explained that when students first came to the vocational school, they did not realize the importance of having math skills:

> When math was first brought to the electrical construction laboratory, the students thought it was a pain, just something more that they had to worry about. The students came to the vocational school to learn electricity, not to sit in a classroom doing math problems.

Students did not always accept vocational/academic classes. An English teacher felt that students were not accepting of the English classes because of a vocational teacher's attitude toward English:

> In English, the curriculum requires that I teach English literature to junior and senior students, something that they are particularly negative about. By

the time students are juniors and seniors, they seem to have had so many negative and nonrelevant experiences in English that they are really resistant. Resistant to the point that many of them do not do the required work in English. The vocational teachers could be a tremendous help. However, many of them do not have adequate English skills themselves, and they do not require students to write in their classes. In fact, one of the vocational teachers had told the students he has never read a book even though he is a college graduate. This reinforces the disrespect students have for English. This type of comment creates a real split between vocational and academic education.

VIEWING TEACHERS' ROLES WITHIN STAGES OF INTEGRATION

From interviews conducted with principals, other administrators, counselors, and teachers of vocational and academic subjects at the ten school sites, six themes emerged. The first three themes identify stages of integration and roles within the stages that teachers assume as they move from school settings where little or no integration exists to settings were extensive integration efforts are underway. Stages within the three themes, which shift from *Cooperative Efforts* to *Curriculum Strategies* to *Instructional Strategies*, are discussed here:

Cooperative Efforts

- **Stage 1**

  For any integration activity to occur, vocational and academic teachers must first learn about one another. This knowledge then enables them to offer help to as well as ask for help from one another.

- **Stage 2**

  From initial offers of help and seeking help, more formal settings emerged where teachers became involved in instructing one another. The instruction focused on teaching one another about basic academic skills—as used in vocational settings and as taught in academic settings. This, in turn, evolved into teachers planning together, sharing information about instruction provided in their classes, and sharing information about students they both had in their classes.

- **Stage 3**

  At this final stage of *Cooperative Efforts*, teachers moved to assisting one another with instruction, carefully dovetailing their instruction, and coordinating the

scheduling of instruction. Vocational and academic teachers approached the instruction of academic skills in the same way and were careful not to give students contradictory information on assignments. Further, the academic teachers willingly rescheduled instructional sequences in their classes to reinforce what students were learning in vocational classes, and vice versa.

Curriculum Strategies

- **Stage 1**

  Building on the theme of *Cooperative Efforts*, the teachers' integration efforts focused on developing curriculum. Here they worked together, often meeting for extensive periods to plan coordinated assignments, projects, and instructional sequences. At this stage, teachers noted the importance of aligning their curricula.

- **Stage 2**

  Changing from past patterns, particularly when they led to instruction that was out of step with needs of today's students, evolved as an important stage in developing curriculum. Both program offerings and in-class instruction were changed as a result of the integration efforts.

- **Stage 3**

  At the most advanced stage of curriculum development, the teachers undertook the design and preparation of elaborate, overtime projects involving coordinated and collaborative instruction. Further, they moved to enhancing the projects through input and participation from individuals in the business community.

Instructional Strategies

- **Stage 1**

  In the day-to-day instructional routine of their classes, the teachers found instances where they could readily integrate vocational and academic content. They were particularly enthusiastic about instances where the integrated efforts led them to focus on applications of academic skills. Further, they learned that students could initiate instances where vocational and academic content are integrated.

- **Stage 2**

  From recognizing instances for achieving the integration, the teachers moved to teaching cooperatively, including joint teaching assignments, joint grading of

assignments, common content taught at the same time in their classes, and common teaching strategies. Further, some of the vocational and academic teachers even moved to team teaching situations where they reinforced one another's instruction in the same classroom setting.

- **Stage 3**

  At the instructional level, as well as at the curriculum development level, the teachers found that their advanced integration efforts could be enhanced by using people and resources from the community.

The *Administrative Practices and Procedures* theme can also be characterized in stages. The stages are, however, directed at actions of administrators that can help teachers assume roles outlined for them in the three previously discussed themes. The three stages of the *Administrative Practices and Procedures* theme follow.

Administrative Practices and Procedures

- **Stage 1**

  An initial strategy that administrators must pursue in implementing the integration of vocational and academic education is one of facilitating the process. Administrators at sites where exemplary integration activities are underway provide team building and support activities that give teachers a feeling of comfort with the substantial changes they are undertaking. Further, the administrators openly address teacher concerns.

- **Stage 2**

  At this second stage, administrators moved to helping teachers understand administrative constraints that they faced and gained teachers support for working within those constraints. Further, the administrators found that they learned from experience, noting that they initially made mistakes which they later overcame. Providing and maintaining adequate and open communication was one area, in particular, where they noted that they learned from experience. Another area where administrators proved effective in facilitating the integration process was scheduling and class organization. Open communications with the teachers helped the administrators identify and resolve scheduling problems.

- **Stage 3**

  Critical to the success of the integration efforts was the teachers' feeling confident of administrative support and feeling that they were involved in the integration process. Failure to meet these two expectations for all teachers on an ongoing basis quickly led to teacher resentment toward the changes. Thus, administrators were not only involved at initial stages of the integration but throughout the process.

The other two themes that emerged from the interviews were *Teacher Outcomes* and *Student Outcomes*. For both of these themes the overwhelming majority of the instances were positive. Even teachers who initially resisted integration efforts noted how they had been positively affected by the process and how they had become better teachers. Further, when discussing the impact of integration on students, the teachers noted a number of positive outcomes including helping students perform both academic and applied tasks better, becoming more proficient in their vocational specialties, relating content between classes, making better grades, and staying in school.

Based on our observations, it was clear that teacher collaboration in integrated school settings is quite different from the ways teachers collaborate in more traditional settings. Boyer (1983) perhaps captured best the traditional view of secondary schools in a comprehensive study of secondary education in America. In Boyer's study, it was noted that teachers of vocational and academic subjects rarely worked together toward common goals and, more often than not, had little comprehension of what other teachers were teaching. In contrast, our interviews captured rich descriptions of a wide range of cooperative activities in which both vocational and academic teachers were engaged. Additionally, vocational and academic teachers were very interested in what other vocational and academic teachers taught and often functioned as members of professional teams as they integrated vocational and academic education.

The integration process appears to place greater demands on teachers to collaborate as they create integrated curricula. Many of the individuals we interviewed described how vocational and academic teachers changed from their traditional curriculum development patterns to new ones focused on vocational teachers reinforcing academic skills and academic teachers using applied instructional procedures. Further, we noted that vocational and academic teachers at the various school sites we visited were actively collaborating with one another as they provided instruction to students. The extent of collaboration ranged

from what Grubb et al. (1991) describe as model one where more academic content is incorporated into vocational classes to model eight where occupational clusters replace traditional vocational and academic departments. Central to the collaborative instruction was teacher teamwork. Were it not for the emphasis on teamwork, the teachers probably would not have been so involved in the integration process.

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APPENDIX A

Principal Interview Schedule

PRINCIPAL INTERVIEW SCHEDULE

1. Date and time: _____

2. Interviewee name: _____

3. Interviewee gender: _____ 4. Interviewer: _____ _____

5. Job title: _____

6. School name: _____

7. School location: _____

8. Feeder school to (if applicable): _____ _____

(START)
Mr./Mrs./Ms./Dr._____, as I mentioned, the National Center for Research in Vocational Education is conducting a study to determine various professional roles in the integration of vocational and academic education. This interview focuses on educators' roles in the integration process. Do you have any questions at this time?

Before the interview begins, let me assure you that your responses will be kept confidential. Would you mind if we recorded the interview?_____ (if no) If there is anything you don't want me to record, just let me know and I'll turn off the recorder.

Do I have your permission to turn on the recorder now?

9. **Now I would like you to discuss various roles in integrating vocational and academic education.**

9.1. As a principal, what is your current role in the integration process?

9.2. What are the roles of vocational teachers in the integration process?

9.3. Specifically, how do vocational teachers integrate vocational and academic education in their vocational classes?

9.4. Specifically, how do vocational teachers collaborate with academic teachers to integrate vocational and academic education?

9.5. In what ways do vocational teachers work with other professional individuals and groups to integrate vocational and academic education (e.g., administrators, counselors, advisory committees)?

9.6. Will you please provide a specific example of student success as an outcome of the vocational teachers' efforts to integrate vocational and academic education?

10. **I would like to get some information about the history of the integration process at your school.**

10.1. When did the integration of vocational and academic education begin at your school?

10.2. Why was the process initiated?

10.3. What was the initial focus of integration? Who was initially involved?

EVENT #1

11. Now I want you to think of a specific situation. This is a situation or a specific time when you and others in your school (vocational and academic teachers) were effective at integrating vocational and academic education. Give particular attention to the roles of *both vocational and academic teachers* in this situation.

EVENT:

PROBES	**BEHAVIOR**	**THOUGHT/FELT**	**EXAMPLES**
Specific General	What you/they did and why	You/others think or feel	Specific

(DON'T FORGET TEACHER ROLES!)

- Who was involved and how?

- What led up to the situation?

- Describe the situation.

- What happened?

- How did it all turn out? (outcome)

EVENT #2

12. Very Good! Now I want you to think of another situation. This time I want you to describe a specific time when you and others (both vocational and academic teachers) would, due to hindsight, change what had been done. In other words, this is a situation where the integration of vocational and academic education could have been improved. Again, give particular attention to the roles of *both* vocational and academic teachers in this situation.

Event:

PROBES	**BEHAVIOR**	**THOUGHT/FELT**	**EXAMPLES**
Specific General	What you/they did and why	You/others think or feel	Specific

(DON'T FORGET TEACHER ROLES)

- Who was involved and how?

- What led up to the situation?

- Describe the situation.

- What happened?

- How did it all turn out? (outcome)

Thanks so much! **Now I need to get some information about your background and professional experience.**

13. Years of experience

13.1. Teaching: _____years

13.2. Counseling: _____years

13.3. Supervision/Administration: _____years

14. Subjects taught over the years: _____

15. Education

15.1. _____ Associate degree (specify major) _____

15.2. _____ Bachelor's degree (specify major) _____

15.3. _____ Master's degree (specify major)_____

15.4. _____ Beyond Master's (specify focus)_____

16. **And, finally, I would like to get some information about your school.**

16.1. What is the student enrollment at your school?

16.2. What percentage of your graduates go on to higher education?

16.3. How many teachers are employed at this school?

16.4. (If a vocational center) How many feeder schools do you serve?

16.5. (If a vocational center) What is the combined enrollment of the feeder schools?

16.6. What is the worker unemployment rate in the school's attendance area?

16.7. Can you provide me with a list of vocational offerings provided by your school?

Many thanks for your cooperation. What you have provided will assist greatly in identifying professional roles in integrating vocational and academic education.

I have enjoyed talking with you.

APPENDIX B

Administrator (Nonprincipal) and Counselor Interview Schedule

ADMINISTRATOR (NONPRINCIPAL) AND COUNSELOR INTERVIEW SCHEDULE

1. Date and time: _____

2. Interviewee name: _____

3. Interviewee gender: _____ 4. Interviewer: _____

5. Job title: _____

6. School name: _____

7. School location: _____

8. Feeder school to (if applicable): _____

(START)
Mr./Mrs./Ms./Dr._____, as I mentioned, the National Center for Research in Vocational Education is conducting a study to determine various professional roles in the integration of vocational and academic education. This interview focuses on educators' roles in the integration process. Do you have any questions at this time?

Before the interview begins, let me assure you that your responses will be kept confidential. Would you mind if we recorded the interview?_____ (if no) If there is anything you don't want me to record, just let me know and I'll turn off the recorder.

Do I have your permission to turn on the recorder now?

9. **Now I would like you to discuss various roles in integrating vocational and academic education.**

9.1. As an administrator/counselor, what is your current role in the integration process?

9.2. What are the roles of vocational teachers in the integration process?

9.3. Specifically, how do vocational teachers integrate vocational and academic education in their vocational classes?

9.4. Specifically, how do vocational teachers collaborate with academic teachers to integrate vocational and academic education?

9.5. In what ways do vocational teachers work with other professional individuals and groups to integrate vocational and academic education (e.g., administrators, counselors, advisory committees)?

9.6. Will you now please provide a specific example of student success as an outcome of the vocational teachers' efforts to integrate vocational and academic education?

EVENT #1

10. Now I want you to think of a specific situation. This is a situation or a specific time when you and others in your school (vocational and academic teachers) were effective at integrating vocational and academic education. Give particular attention to the roles of *both vocational and academic teachers* in this situation.

EVENT:

PROBES	**BEHAVIOR**	**THOUGHT/FELT**	**EXAMPLES**
Specific General	What you/they did and why	You/others think or feel	Specific

(DON'T FORGET TEACHER ROLES!)

- Who was involved and how?

- What led up to the situation?

- Describe the situation.

- What happened?

- How did it all turn out? (outcome)

EVENT #2

11. Very Good! Now I want you to think of another situation. This time I want you to describe a specific time when you and others (both vocational and academic teachers) would, due to hindsight, change what had been done. In other words, this is a situation where the integration of vocational and academic education could have been improved. Again, give particular attention to the roles of *both* vocational and academic teachers in this situation.

Event:

PROBES	**BEHAVIOR**	**THOUGHT/FELT**	**EXAMPLES**
Specific General	What you/they did and why	You/others think or feel	Specific

(DON'T FORGET TEACHER ROLES)

- Who was involved and how?

- What led up to the situation?

- Describe the situation.

- What happened?

- How did it all turn out? (outcome)

Thanks so much! **Now I need to get some information about your background and teaching experience.**

12. Years of experience

12.1. Teaching: _____years

12.2. Counseling: _____years

12.3. Supervision/Administration: _____years

13. Subjects taught over the years: _____

14. Education

14.1. _____ Associate degree (specify major) _____

14.2. _____ Bachelor's degree (specify major) _____

14.3. _____ Master's degree (specify major)_____

14.4. _____ Beyond Master's (specify focus)_____

Many thanks for your cooperation. What you have provided will assist greatly in identifying professional roles in integrating vocational and academic education.

I have enjoyed talking with you.

APPENDIX C

Vocational and Academic Teacher Interview Schedule

VOCATIONAL AND ACADEMIC TEACHER INTERVIEW SCHEDULE

1. Date and time: _____

2. Interviewee name: _____

3. Interviewee gender: _____ 4. Interviewer: _____

5. Job title: _____

6. School name: _____

7. School location: _____

8. Feeder school to (if applicable): _____

(START)
Mr./Mrs./Ms./Dr._____, as I mentioned, the National Center for Research in Vocational Education is conducting a study to determine what the teacher's role is in the integration of vocational and academic education. This interview focuses on your role in the integration process. Do you have any questions at this time?

Before the interview begins, let me assure you that your responses will be kept confidential. Would you mind if we recorded the interview?_____ (if no) If there is anything you don't want me to record, just let me know and I'll turn off the recorder.

Do I have your permission to turn on the recorder now?

9. **Now I would like you to discuss various persons' roles in integrating vocational and academic education.**

9.1. As a vocational/academic teacher, what is your current role in the integration process?

9.2. What are the roles of vocational/academic teachers in the integration process?

9.3. Specifically, how do you integrate vocational and academic education in your classes?

9.4. Specifically, how do vocational teachers and academic teachers collaborate to integrate vocational and academic education?

9.5. In what ways do vocational and academic teachers work with other professional persons and groups to integrate vocational and academic education (e.g., administrators, counselors, advisory committees)?

9.6. Can you provide me with a specific example of student success as an outcome of vocational and academic teachers' efforts to integrate vocational and academic education?

EVENT #1

10. Now I want you to think of a specific situation. This is a situation or a specific time when you and other teachers (both vocational and academic) were effective at integrating vocational and academic education. Give particular attention to the roles of *both vocational and academic teachers* in this situation.

EVENT:

PROBES	**BEHAVIOR**	**THOUGHT/FELT**	**EXAMPLES**
Specific General	What you/they did and why	You/others think or feel	Specific

(DON'T FORGET TEACHER ROLES!)

- Who was involved and how?

- What led up to the situation?

- Describe the situation.

- What happened?

- How did it all turn out? (outcome)

EVENT #2

11. Very Good! Now I want you to think of another situation. This time I want you to describe a specific time when you and other teachers (both vocational and academic) would, due to hindsight, change what you had done. In other words, this is a situation where the integration of vocational and academic education could have been improved. Again, give attention to the roles of *both* vocational and academic teachers in this situation.

Event:

PROBES	**BEHAVIOR**	**THOUGHT/FELT**	**EXAMPLES**
Specific General	What you/they did and why	You/others think or feel	Specific

(DON'T FORGET TEACHER ROLES)

- Who was involved and how?

- What led up to the situation?

- Describe the situation.

- What happened?

- How did it all turn out? (outcome)

Thanks so much! **Now I need to get some information about your background and teaching experience.**

12. Years of experience

12.1. Teaching: _____years

12.2. Supervision/Administration: _____years

12.3. Work experience in teaching area: _____years

13. Subjects taught over the years: _____

14. Education

14.1. _____ Less than associate degree

14.2. _____ Associate degree (specify major) _____

14.3. _____ Bachelor's degree (specify major) _____

14.4. _____ Master's degree (specify major)_____

14.5. _____ Beyond Master's (specify focus)_____

Many thanks for your cooperation. What you have provided will assist greatly in identifying the roles of teachers in integrating vocational and academic education.

I have enjoyed talking with you.

APPENDIX D

Site Descriptions

SITE NUMBER ONE

Site Number One is a rural vocational center located in the Appalachian Mountains. The center was established in 1969 and has continually strived to meet the training and educational needs of the entire county, enrolling students from eight feeder high schools as well as adult students. This goal, together with its location and low postsecondary tuition, enable it to serve both secondary and postsecondary students.

Site One has achieved accreditation by the State Department of Education. It is accredited by the Board of Nursing Examiners for Practical Nurses, Licensed Practical Nurses Association, and American Nurses Association. Additionally, the site has been accredited by the Welding Certification Station and American Association of Certified Electronics Technicians.

The school is a member of the County Chamber of Commerce, Boy Scouts of America, and National Vocational Technical Honor Society. Students are provided many activities from which to participate, including Future Business Leaders of America, Distributive Education Clubs of America, and Vocational Industrial Clubs of America.

Site One prides itself in playing a vital role in the economic development of the county. The school administration and staff deserve special recognition for their ability to offer academic and training programs quickly as demands arise. School programs are continually evaluated and updated to ensure the most pertinent courses are being offered. The school offers more than forty programs in technical training. Further, students may choose to become involved in nontechnical programs that offer college transfer credit to two local colleges.

The school is divided into five divisions. One division provides necessary student services such as placement and counseling. The other four are instructional. They are the division of (1) Allied Health Sciences, (2) Engineering Technology, (3) Industrial Occupations, and (4) Business Occupations. Each division offers its own programs with varying completion lengths ranging up to two years.

Since Site One is a vocational school serving feeder high schools, its integration of vocational and academic subjects is rather unique. The school uses the Par Test system

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which assesses students' competencies in all academic areas. The school staff then uses the assessment to identify deficiencies and build these skills. Currently, the administrators are trying to organize an inservice program to allow teachers from the feeder schools to visit the center to see how they could support integration from their home schools.

At Site One, integration is facilitated through an on-staff mathematics teacher and English teacher. The math teacher on staff at the school rotates among the vocational classes. The math is taught in the laboratory setting where the students can actually relate it to what they are working on. The vocational instructor is also present to offer assistance in applications.

English is integrated at Site One through an applied communications course. This is taught away from the laboratory, but students from similar program areas are grouped together and use excerpts from their laboratory books to facilitate integration and make application easier. The English teacher offers reading and writing in addition to communication skills.

Vocational students at the center are helped to recognize the importance of academics through the use of guest speakers, expositions, and the Basic Academic Skills for Employment (BASE) computer program. The guest speakers provide insight for the students on actual applications of the academics in the local businesses. Students have additional opportunity to learn the importance of integration at expositions such as career awareness day. Students speak directly with employers to discover, for themselves, what skills employers want an employee to possess. The BASE program performs a similar function for the students. Participating students receive computer experience at the same time they learn the importance of knowing both vocations and academics.

The vocational teachers support integration and are achieving it in the laboratory setting by having students write papers about the activities and tools they use. Students are also required to read a trade magazine. This builds reading skills and a knowledge of their fields. For example, the business students study entrepreneurs and write papers about them. Further, students work through a computer program that enables them to pretend they are operating a business, which builds many skills along the way, including reading, writing, and communication.

SITE NUMBER TWO

Site Number Two is an urban comprehensive high school. The school serves fourteen-hundred students and has ninety-three full-time faculty members. In 1989, a business academy was established within the school. Although Site Two has a staff that tries to continually integrate vocational and academic subjects schoolwide, nearly all integration takes place within the business academy. Methods of achieving integration include guest speakers, field trips, and planning for activities across classes.

The academy has invited guest speakers to discuss the ways in which business, English, and mathematics are related. Landscapers, accountants, small business owners, architects, and newspaper people are among the professions represented by individuals who have spoken with the students. The speakers have provided the students an opportunity to learn of the importance of all their classes from individuals in the workforce in addition to their teachers. A professor from a local college also visited to help the students revise term papers.

Academy students have taken field trips to area businesses in an effort to improve integration. The trips allow students to see integration in an actual working environment. This builds their appreciation for all subjects and helps them see how vocational and academic areas relate.

Planning for integration is ongoing at Site Two. The lunch period has been arranged so that all of the academy teachers have lunch together. This gives them extra time to meet and discuss class activities informally. From these times and other scheduled meetings, the faculty are able to determine what is taking place in one another's classes. The teachers planned meetings with the local business community to discover what skills upcoming graduates need. Extensive planning at the school has resulted in the introduction of English and math assignments in the vocational classes.

Integrated activities between English and the vocational classes that have evolved from planning include using terms from the accounting text as an English vocabulary list and writing letters to Mark Twain describing the changes in job training and salaries that have taken place since Twain's day. Through typing their own English papers, students enhance both computer and English skills. For one such paper, students were required to

write on their vocational area. Some of the papers were presented orally to improve oral communication skills.

Math integration has also increased as a result of planning at Site Two. Students are writing about math topics while following grammar rules which enables them to develop a better understanding of both math and grammar from one assignment. In another instance, students acquire knowledge of formulas, computers, and software applications by entering formulas and manipulating data on a computer.

SITE NUMBER THREE

Site Number Three is a vocational center serving six feeder high schools throughout the county and is located in the suburbs of a major city. The center has an enrollment of four-hundred students and employs fourteen faculty members.

Fifteen vocational programs are offered at the school. Students receive credit for successful completion of work performed at the center. The credit counts toward the minimum twenty-one units required for graduation from high school.

Students attending the vocational center are allowed to choose among two tracks to satisfy their graduation requirements. The school system has certain core requirements that students in both tracks must take, but the system allows for electives under each. The first gives the student a standard diploma with a vocational option. The second track offers a regents diploma.

The two diplomas differ in that the standard diploma allows students to take two years of a vocational program. The students complete an entire vocational plan. They are then able to enter the workforce with their certification. The regents diploma allows students to complete one year of vocational education. Under this plan, students take more college preparatory courses and are expected to continue their education on a higher level.

The integration of vocational and academic coursework began at the center in 1985 based on the students' lack of basic skills; however, a full scale effort did not begin until about 1989. The center offers workshops where the teachers of vocational courses meet

with academic teachers and discuss ways to integrate coursework. Currently, the center achieves integration of vocational and academic coursework through a pull-out system, vocational applied materials (VAM), and curriculum development in vocational and academic courses.

At the center, much of the integration effort is focused on a pull-out system. Students with deficiencies in mathematics or English are excused from part of the three-hour laboratory time to attend classes taught by on-staff academic instructors at the vocational center. Pulled-out students receive more opportunity to build their academic skills. However, the students are not always provided with a practical teaching approach because the pulled-out group of students come from differing programs which makes teaching math or English in a way that is applicable to the whole class difficult.

Teachers at the school also use the VAM materials to aid integration. VAM provides a test that points out deficiencies in vocational students' math. Using the test results, the faculty are able to determine what math skills need to be reinforced for the pull-out students.

The vocational teachers at the center improve integration by stressing the importance of academics in their own classes. For example, the cosmetology teacher requires students to track their progress toward certification by maintaining a record of their work hours, which increases math abilities. The cosmetology teacher also provides instruction on communication skills, which are vital in a public service field. In the child care class students are taught to improve their reading and writing skills. Algebra is illustrated practically in the electronics courses.

The academic teachers at the center are also integrating vocational and academic education in their courses. For example, the English instructor assigns students to read selected current events, relate them to their field, and show their importance. Copies of the local newspaper are brought to the classroom, and the students read them. Students receive reading practice and an awareness of current events from this activity.

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SITE NUMBER FOUR

Site Number Four is a comprehensive vocational high school located in a rural area with an enrollment of more than eight-hundred students in grades nine through twelve. In addition to a high school diploma, students graduating from this school receive a vocational training certificate documenting job-specific vocational competencies.

Since 1985, instruction at Site Four has been provided through vocational/technical clusters. These clusters are groupings of specific vocational and academic teachers with each providing instruction in a related relevant manner. Each cluster consists of an English teacher, a science teacher, a social studies teacher, a math teacher, a health/physical education teacher, and a number of vocational teachers. A guidance counselor and a cooperative education coordinator alternate their time among the clusters.

Site Four has twenty-one programs divided into the following four clusters: (1) technical, (2) service, (3) construction, and (4) communication/transportation. Each cluster consists of between three and seven specific areas. The technical cluster includes electronic technology, data processing, and drafting and design, The service cluster consists of cosmetology, health assistant, marketing/distributive education, ornamental horticulture, food service, child care, and law enforcement. Included in the communication/transportation cluster is auto body, auto mechanics, commercial art, graphic arts, and machine shop. The construction cluster consists of air conditioning/refrigeration, building construction, carpentry, electricity, sheet metal/welding, and masonry.

Since its establishment in 1970, students at Site Four have alternated weeks of instruction. One week students are in vocational classes, the following week they are in academic classes. This arrangement allows the students to make optimum use of their time in vocational classes and subsequently complete projects and assigned tasks quickly without the wasted effort generally attributed to the set-up and clean-up of vocational laboratories.

Ninth-grade students at Site Four have the opportunity to explore all twenty-one vocational programs. These students also alternate their weeks of instruction between vocational and academic subjects, but instead of being committed to a single specific vocational cluster, they investigate them all. During the vocational weeks, teams of three

ninth graders attend two labs, each for two-and-a-half days. The next vocational week, these students will be in another two labs, again for two-and-a-half days each.

The ninth-grade exploratory program allows students to explore vocational areas that perhaps they have never considered as career options. When the vocational rotations are completed for the ninth graders, the students can further explore their selected clusters or begin study in a specific area.

The team teaching approach of the clusters has been the center of Site Four's integration effort. The cluster provided a qualified teacher from a particular discipline that is ready to instruct in whatever area the students are studying that week. Currently, mathematics, language arts, and science have been integrated into the vocational setting through clusters. Additionally, vocational teachers have been introducing more academics in their classes.

Academic math skills have been integrated into vocational courses at Site Four. Previous vocational students who were deficient in measuring, decimals, and conversions were provided the necessary instruction as needed from a cluster instructor allowing students to continue their hands-on training in the laboratories.

Currently, the language arts teacher is involved in the technical cluster. The teacher ensures students are developing necessary communication skills. This is accomplished through direct observation of the students while they are in the laboratory. The cluster approach enables the observation to be accomplished and then deficiencies can be improved as well.

Science is integrated in the food service course by having students study beyond the science text. Students discover the effects of microorganisms on food. They study disease and food contamination and how to prevent them.

The cluster aids integration in the auto mechanics class, also. The students are required to write a technical paper. The vocational instructor provides the vocabulary to the English teacher who grades the structure of the paper.

Integration at Site Four is a continual process. The teachers view integration as horizontal. They try to relate every vocational lesson academically and every academic lesson vocationally.

SITE NUMBER FIVE

Site Number Five is a magnet vocational/technical secondary school with an enrollment of approximately 1450 students in grades nine through twelve. Student enrollment is on a selective basis, with students selected on the basis of teacher/principal recommendations, grade point average, standardized test scores, and citizenship. More students apply than can be accepted. Students attending classes at Site Five are considered magnet students and upon graduation are exceptionally well-qualified to assume jobs of responsibility in their selected fields.

During their freshman and sophomore years, students at Site Five receive instruction in basic technology. By the beginning of their junior year, students declare a major or technical specialization. Students who immediately after graduation plan to obtain a job, enter the military, or pursue further technical training, spend three or four periods of a nine-period day in their technical major. Students on a college-bound track spend about two periods a day on their technical major.

Students at Site Five choose from the following seven technical majors: (1) communications, (2) electricity, (3) electronics, (4) transportation, (5) manufacturing, (6) building construction, and (7) health occupations. Graphics, photography, radio, and journalism are included in the communications major. The transportation major includes auto body, aviation, diesel, fluid power, and auto mechanics. Plastics, metals, machine, casting, and mold making are included in the manufacturing major. The drafting major includes engineering and architecture drafting, and the health occupations major includes medical and dental health.

Site Five has in place an extensive integration program between the English curriculum and the technical areas. The use of the library is a primary component of the integration efforts. Students at each grade level have stated goals and behavioral objectives for the integrated English and vocational projects which the teachers present to them at the

beginning of each quarter. The freshman and sophomore integration projects are more extensive and more thoroughly defined than those for the junior and senior years.

The integration of vocational and academic courses at Site Five covers grades nine through twelve beginning with the freshmen students. The students perform an assignment on career exploration. For this assignment, students are required to interview someone from an industry, write a report, and present the information orally. The complete project is graded on content by the vocational teacher and on structure by the English teacher. Sophomores are assigned a similar project where they are required to gather information about an occupation they are interested in. In addition, junior and senior vocational students at Site Five write in journals describing activities undertaken in their vocational classes. The students then write a paper in English class from the journals. The students receive a grade from the English teacher while writing about something they know and enjoy.

In addition to the formal programs, teachers at Site Five try to integrate vocational and academic subjects whenever possible. The faculty believe students benefit from a practical, meaningful lesson. For example, one of the technology instructors is working with the English teacher on developing students' skills for résumé preparation as well as writing final résumés. After composing a résumé, each student receives a grade in both classes. As another example, business students at the school complete a technical writing task that provides training for them to clearly explain the necessary tasks or materials needed at a job site. Students learn the fundamentals in English and the basic skills required in their vocation.

SITE NUMBER SIX

Site Number Six consists of a vocational center and six feeder high schools all located in a rural area. The feeder schools range in distance from three to thirty-seven miles from the center. The center's service area is approximately 1414 square miles and has an unemployment rate of six percent. Approximately five-hundred students are enrolled at the center. Of these, sixty-five percent are adults, and thirty-five percent are high school students. The school has seventeen full-time equivalent faculty. Currently, Site Six is

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integrating academic coursework into vocational classes through applied courses, guest speakers and field trips, and individual vocational classes.

Students in applied mathematics and applied physics are developing skills they can remember and use in life. For example, in one lesson the students are required to measure a room and calculate the amount of paint necessary to cover the walls.

Guest speakers and field trips have been a part of the site's integration. Several business community members have been invited to speak with the students regarding what skills are needed on the job. The students have also gone to businesses and seen first-hand what is required to succeed in the workplace.

In the computer class, students prepare papers using the personal computer. They use English rules learned in their academic courses and software knowledge from computer class to develop one paper. The assignment is then graded for content, structure, and the amount of computer knowledge gained by the student.

The health occupations program classes are also integrating vocational and academic education. Students in this area are required to prepare written and oral reports. This provides health profession students with needed communication skills.

SITE NUMBER SEVEN

Site Number Seven is a comprehensive high school located in a suburban area. The school serves grades nine through twelve and had an enrollment of over twenty-two hundred students in 1990. The total distribution of males and females is nearly equal in numbers. Enrollment has been increasing rapidly for the last five years and is expected to surpass three-thousand students by the 1997 school year or ten percent growth per year. Approximately twelve percent of the students' families are at or below the poverty level.

The administrative staff of the school is encouraging the integration of vocational and academic coursework. The administration provides time and funding for the integration process. Currently, integration is offered at Site Seven through the Southern Regional Education Board's (SREB) program and teacher collaboration.

The SREB program at Site Seven is a combination of the SREB's pilot program and the state's own guidelines. Through this program, teachers attend summer workshops on how to use applied curriculums in the math, science, and language arts areas. Many teachers have begun instituting applied instructional methods into their regular coursework. Teacher teams of both vocational and academic disciplines have been formed. Integrated vocational and academic instruction is being accomplished by teaching academics through applied curriculums and bringing applied teaching methods into academic courses.

For example, the business education department has integrated the word processing with the English coursework. Students type their English writing assignments in their word processing class. The work is graded in both classes. The word processing teacher grades the students on their use of the software, while the English teacher examines the content of the writing. Science coursework has been integrated similarly with word processing.

Collaboration of both the vocational and academic teachers facilitated several integration activities at Site Seven. Teachers meet at scheduled, as well as informal, times to discuss methods of integration. Through this dedication, the word processing and English courses have become integrated. Students are encouraged to write their papers using the computer and receive a grade in both classes. The science class has done similar integration by having students type their experiment write-ups on the personal computer. The math and vocational teachers have begun collaborating to develop a vocabulary that is consistent in both classes. This minimizes confusion and allows students the opportunity to see the same terms in both courses. Additionally, teachers have been visiting other classes to speak on their subject and to observe other classes. Through observation, teachers are able to find more ways to integrate vocational and academic classes.

Site Seven's staff has strived to provide the best education possible to their students. Their efforts have resulted in a dropout rate of only two percent, one of the lowest in the state. Additionally, the school boasts having SAT scores above the national average. The school is also proud of its over ninety percent attendance rate. The SREB program and teacher collaboration efforts have led to the accomplishments at Site Seven. Additionally, the school has begun a School-Within-a-School, a compact program, and Teachers as Advisors programs which have had direct impact on the school's success.

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The School-Within-a-School program emphasizes attendance and self-esteem. Selected ninth-grade students participate in a seven-period day taught by a team consisting of six content area instructors and one elective teacher. The six courses include English, general science, and pre-algebra. Semester classes of geography, life management skills, peer counseling I and II, personal fitness, and American government are offered, as well as course modifications of reading I and computer literacy. Students completing the one-year program receive eight credits. The administration at Site Seven hopes to offer the program to all students in the future.

The compact program at Site Seven is a cooperative effort between business, education, government, and the community. The program attempts to reduce the dropout rate, increase school attendance, improve students' self-esteem, improve students' employability, provide job opportunities, and encourage students' desires to graduate. Compact identifies at-risk students and teams each with a mentor from the business community. Of the students enrolled in this program for the 1989-1990 school year, thirty-five percent increased their grade point average by 0.5, nine percent increased by 1.0, and three percent increased by 2.0 or more.

The Teachers as Advisors program provides small group and individual advisement to all students in both academic and career planning areas. Administrators, guidance counselors, and faculty participate as advisors. Students may obtain advice about grades, the use of time, career plans, life in school and out, attendance, discipline, study skills, test taking, college, and employability. Advisors hope to serve students' overall development, academic and emotional.

SITE NUMBER EIGHT

Site Number Eight is a comprehensive high school serving a student body in excess of twelve hundred. The student body is divided almost equally on the basis of gender. However, the racial make-up of students is sixty-six percent African American, thirty-three percent white, and one percent other. Conversely, the nearly seventy faculty members are about two-thirds white and one-third African American. Currently, eight percent of the community workforce is unemployed. Manufacturing accounts for employing the largest segment, which is thirteen percent of the workforce.

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The school's administration is dedicated to raising all students' math, science, and communication skills. This school has joined SREB in an effort to fulfill this goal. The school has been focusing on the integration of vocational and academic education through a business academy, the SREB Tech Prep program, and efforts from both the vocational and academic teachers.

The business academy at the high school is based on the school-within-a-school concept. Participation in the program is voluntary and certain minimum requirements are needed to participate. For example, students may not have attendance or discipline problems, must possess an interest in a varied teaching approach, must have a grade point average that is below the students' abilities, and must meet course prerequisites. Students in the academy receive special attention due to the smaller class sizes. Classes are scheduled as a block consisting of three periods. The courses in the block are marketing, biology I, and English II. Teachers with common planning periods team teach in the academy. Each student is assigned a mentor. The mentor is a local employer who will devote two to four hours a month to the student.

The academy provides the students with increased self-esteem, responsibility, and a positive attitude. Students receive work experience through a summer job after the eleventh grade. Students also participate in a work experience program during twelfth grade. At-risk students are encouraged to stay in school, and attendance patterns are improved for all participants. The students gain better insight toward life after school through guest speakers and field trips.

The Tech Prep program blends higher level vocational and academic courses to satisfy the graduates' need for a more technically oriented background necessary in the twenty-first century. The integration is accomplished through applied and laboratory methods. The program design enables students to continue and receive further education because Tech Prep work counts as college transferable credit, or graduates may choose to enter the workforce upon graduation. Presently, three concentration areas are available to students in the Tech Prep program. These are drafting-CAD, business accounting, and electronics. Students not in Tech Prep are able to select from over twenty concentration areas, including auto body repair, health occupations, and horticulture.

Goals of the Tech Prep program include increasing the percentage of high school students who pursue further education, increasing the number of students in grade-level or above instruction, improving the technical knowledge of the students, and allowing students to move from one level of technical training to another without unnecessary duplication of coursework. These goals are achieved through applied, hands-on, laboratory-based teaching.

Vocational and academic teachers at the high school are working individually and as a group toward integration. They attend summer workshops on integration. At one workshop the math and vocational teachers jointly developed a math matrix. The matrix is used as a guide for teaching math concepts. Each cell contains a needed math skill and designates which vocational course will teach that skill. Currently, teachers are trying to develop a science matrix to aid integration. The English and vocational faculty jointly grade the senior students' term papers. The faculty members share equipment when applicable to facilitate interaction.

Individually, vocational teachers are working to introduce the academics in their classes by stressing academic skills whenever possible. For example, math is utilized when measurements are covered in home economics and when formatting is discussed in typing. Home economics students type recipes on the personal computer to gain software knowledge. Creative writing is becoming part of the home economics class. Vocational teachers are relaying the importance of reading within content to the students.

Academic teachers are also working individually toward integration. For example, students are required to write résumés in English to and perform mock interviews in speech. These activities help both vocational and academic students.

SITE NUMBER NINE

Site Number Nine is an area vocational center located in a rural area serving the entire eighteen-hundred square miles of the county plus other outlying areas in adjacent counties. The school district began the integration of vocational and academic coursework in 1988. The implementation was started in the five middle schools and then extended to

include the four area high schools. Combined enrollment of the high schools consists of approximately twelve-hundred students.

The school's administration supports the integration of vocational and academic coursework. They work with vocational and academic teachers to see that integration is taking place. They offer suggestions to improve the process and provide the facilities, time, and materials needed to integrate. Currently, integration is being accomplished through modules, team teaching, and a committed faculty.

Integration was initiated in Site Nine through the modular concept in their middle and high schools' technology course. A module is a workstation designed to accommodate two students. Thirty-six different workstations exist in one large room to accommodate the course. Students working together as a team are able to rotate among the various learning activities. Therefore, each module is utilized by a different team, and only one equipment set is needed for each module instead of providing an equipment set for each member of the entire class. By rotating among modules after completing activities, students are able to complete the necessary coursework within the school term. Students at Site Nine stay busy and are interested in what they are learning in the modules.

Additionally, team teaching has been introduced at Site Nine to facilitate integration. Team teaching is currently being utilized in the applied mathematics and principles of technology courses. Applied math provides a practical, hands-on approach to math applications. The applied math course is team taught by the math and technology teachers; the principles of technology course is taught by the technology and physics teachers. This course provides a hands-on approach to applied physics.

Site Nine's faculty are dedicated to improving education through integration. Workshops, advisory boards, and committees are being utilized extensively. The faculty have accomplished much in the way of bringing vocational and academic subjects together through informal discussions at lunch or during planning periods. The discussions center around teachers discovering how their subject can be applied in other areas. This knowledge is then transformed into a class lesson.

For example, the discussions have led to the integration of math when the adding machine is taught to business students. Math is also being integrated into the accounting

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coursework. The English and data processing instructors are working to develop writing assignments that can be counted for credit in both classes. Also students in a publications class at a feeder high school are producing the school newspaper, a yearbook, and menus for area restaurants.

SITE NUMBER TEN

Site Number Ten is a comprehensive high school located in a rural area. The district believes continuing education should be made available to all citizens of the community, and it makes every effort to do so.

Site Ten is the only high school servicing the school district. Enrollment consists of grades nine through twelve totaling 845 students, 18.4 students per teacher. The school provides exploratory, prevocational, and vocational programs. Students are offered vocational-technical and academic courses.

The administration has presented the integration of vocational and academic coursework by utilizing several approaches. Current approaches include teaching in teams, offering applied mathematics, and collaboration among vocational and academic teachers.

Team teaching at the school is offered in the principles of technology course. Both the physics and technology teachers work together to ensure the students understand the physical principles underlying modern technology. They provide practical lessons that students are able to follow and apply to life after school.

The applied math course enables students to see first-hand actual applications of what is being learned. They are taught a practical, hands-on approach to math.

Additionally, the vocational teachers have been working to incorporate academics into their lessons whenever appropriate. For example, the mechanics instructor attempts to divide the coursework equally between academics and skill training; while the welding instructor informs the mathematics teacher when any students are having difficulties with math. The math teacher is then able to provide extra attention to the students to help them

develop their math skills. This mutual effort illustrates the respect the teachers have for one another, respect that benefits the students.

The academic teachers at Site Ten make every effort to ensure that whatever they are teaching is relevant. They continually update their lessons to provide real-life situations that both vocational and academic students can relate to. Although there are only two scheduled faculty meetings to discuss integration, the teachers speak with each other whenever possible, including at lunch or during planning periods, to discover new ways of integration. This helps the academic teachers keep attuned to the vocational students' needs.

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APPENDIX E

Sample Write-up

Sample Write-Up
S3VT4E1

Interview Date: 5-14-91
Location: S3
Interviewee Code: S3VT4E1
Interviewer: BJS
Event: 1

Situation: The only organized contact between the vocational and academic teachers has been workshops that were structured to have math and English teachers reveal methods of teaching to vocational teachers. Math and English teachers were chosen to head the workshops. The idea was to help vocational teachers teach academic subjects. Two workshops were held in the summer. One was two years ago, and then another was held a year ago. So far there hasn't been a seminar of vocational teachers presenting information to academic teachers. The academic teachers addressed various topics, and the vocational teachers could select classes to attend.

Who Was Involved: The electronics teacher (interviewee), other vocational teachers, and academic teachers including English were involved in this event.

Behaviors/Thoughts/Feelings: At the summer workshops, the academic teachers taught certain concepts and addressed questions asked by the vocational education teachers. The workshops were helpful to me to a limited degree. As a follow-up to the workshops, I was to develop lesson plans for math and English competencies. One workshop I took was on math. The idea of the plans was not as much innovation as identifying the basic skills that were included. The plans I developed were somewhat helpful, but most of the basics for math I already knew from the use of math in my electronics class. For another workshop, I selected writing because it is often a problem for my students. I also selected speaking and public speaking due to the difficulty my students have in communicating orally. Oral communication is a difficult task for them. The academic teachers volunteered to lead the workshops and were intended to be qualified to lead vocational teachers in teaching basic skills to their students. What the academic teachers tried to do was relate what they were teaching the vocational teachers to real-life situations. In the writing

workshop, the academic teacher had a free hand as to what to do. Technical writing was the way the workshop was listed. The academic teacher started by pulling out an electronics dictionary and looking up a topic, "super hetrodine receiving." She read verbatim the definition. It was overwhelming. She used this example to say that the teacher needs to gear information in class to the target audience, the students. In other words, rephrase the same thing in different ways so that students will receive it. By choice of language and such, teachers can key in to their audiences. The thrust was how to key oneself to the student where the student is right now.

Outcome: As a result of the workshops, I was then able to use the techniques I learned in my electronics class and make my speech and math more basic. I can assign a student technical writing without telling the student that is what the student is to do. If a vocational teacher tells students they are doing technical writing, they will draw back or shut down. If vocational students hear algebra, they shut down, too. If I want the students to write something, I ask them to explain a process they already know how to use to another individual who does not know the process. The students then must communicate to the other person so that everything is done correctly and accurately. The students then have to use their problem-solving and logic abilities as well as writing skills to communicate. I have seen the students' communication skills improve in the classroom through the different approach I am using. A teacher can pick up a lot from other teachers, regardless of the context of the interaction with the teachers. Every teacher has certain techniques that work, techniques that can be translated from one classroom to another, whether the content being taught or the situation is exactly the same or not.